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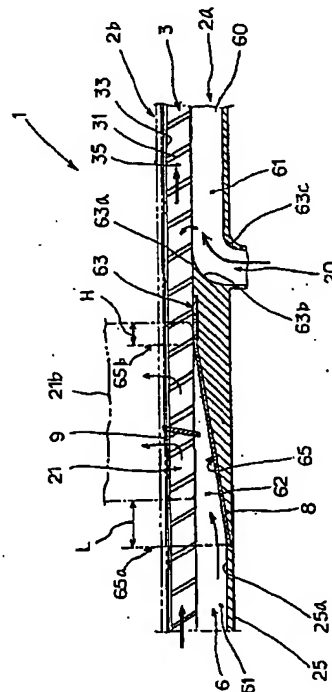
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(54) 【発明の名称】 加圧遠心ポンプ

(57) 【要約】

【課題】 吸い込んだ流体を加圧面による押し出し力と羽根による遠心力を付加させながら円滑に送出すると共に、簡潔で廉価な構成を以て流量及び流圧とも高く所望に設定することができる加圧遠心ポンプを提供する。

【解決手段】 ドラム状のケース2内で羽根車3を回転させることにより、流体を吸込口20から吸い込み送出口21から外部へ送出するポンプで、前記ケース2内で羽根車3の中心部の側方に仕切り壁60を設置し、該仕切り壁60の周囲に、吸込口20側から流体の吸い込みを促進させる吸込室61と、吸い込まれた流体を底壁25a側の圧縮開始点65aから羽根車3側に向けて斜設した加圧面65で加圧する圧縮室62とからなる加圧室6を形成し、上記加圧面65の圧縮終了点65bと吸込口20との間に、羽根車3の側面に近接し羽根車35内の流体の漏出を防止する加圧仕切り壁63を設けると共に、送出口21を上記圧縮開始点65aと圧縮終了点65bの共に羽根車回転方向下手側の近傍位置とにわたる長さで、羽根31巾と略同巾状に開設する加圧遠心ポンプにしている。



【特許請求の範囲】

【請求項1】 吸込口(20)と送出口(21)を有するドラム状のケース(2)内で、複数の羽根(31)を放射状に形成した羽根車(3)を回転させることにより、流体を吸込口(20)から吸い込み送出口(21)から外部へ送出するポンプにおいて、前記ケース(2)内で羽根車(3)の中心部の側方に仕切り壁(60)を設置し、該仕切り壁(60)の周囲に、吸込口(20)側から流体の吸い込みを促進させる吸込室(61)と、吸い込まれた流体を底壁(25a)側の圧縮開始点(65a)から羽根車(3)側に向けて斜設した加圧面(65)で加圧する圧縮室(62)とからなる加圧室(6)を形成し、上記加圧面(65)の圧縮終了点(65b)と吸込口(20)との間に、羽根車(3)の側面に近接し羽根室(35)内の流体の漏出を防止する加圧仕切り壁(63)を設けると共に、送出口(21)を上記圧縮開始点(65a)と圧縮終了点(65b)の共に羽根車回転方向下手側の近傍位置とにわたる長さで、羽根(31)巾と略同巾状に開設することを特徴とする加圧遠心ポンプ。

【請求項2】 送出口(21)の長さ方向の中途部に、流体の送出案内を行うガイド部材(9)を設ける請求項1の加圧遠心ポンプ。

【請求項3】 圧縮開始点(65a)を、羽根車回転方向上手側に向けて加圧面(65)の内周側から外周側に向けて形成する請求項1又は2の加圧遠心ポンプ。

【請求項4】 加圧面(65)の表面を耐磨耗性部材(8)によって形成する請求項1又は2又は3の加圧遠心ポンプ。

【請求項5】 羽根(31)を、羽根車回転方向下手側に向けて緩傾斜の後退角で形成した基部面(36)から、屈曲面(37)を介して急傾斜の後退角で形成した案内面(38)で形成する請求項1又は2又は3又は4の加圧遠心ポンプ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、ポンプケース内で羽根車を回転させることにより、気体或いは液体等の流体を吸い込み送出する加圧遠心ポンプに関する。

【0002】

【従来の技術】従来、エアー或いは水、油等の流体の吸い込み送出を行う遠心ポンプは、単一なドラム状のポンプケース内で、凹溝状の羽根室を形成する複数の羽根を有した羽根車を回転させることにより、該ケースの一侧同壁面に設けた吸入口から流体を吸い込み、これを持ち回り回転させて加速し、送出口から流体の送出を行うように構成したものが既に知られている。

【0003】

【発明が解決しようとする課題】然し、上記のような従来の構成による遠心ポンプは、流体をケース内で羽根車

によって単に加速回転させて送出するだけなので、送出流体の量(流量)は比較的簡単な手段で大きくすることができものの、送出流体の圧力(流圧)は該流量に対して増大させることが困難である等の欠点がある。またこれを補う上で、羽根車の回転を高めると羽根室内での流体の乱流が生じ易くなってポンプ効率を低下させると共に、流圧及び流量を共に高めようとすると、羽根車の羽根形状が複雑になること、及び羽根車が径大になってポンプ全体が大型化し高コストになる等の問題がある。

【0004】

【課題を解決するための手段】上記従来の問題点を解消するために本発明による加圧遠心ポンプは、第1に、吸込口20と送出口21を有するドラム状のケース2内で、複数の羽根31を放射状に形成した羽根車3を回転させることにより、流体を吸込口20から吸い込み送出口21から外部へ送出するポンプにおいて、前記ケース2内で羽根車3の中心部の側方に仕切り壁60を設置し、該仕切り壁60の周囲に、吸込口20側から流体の吸い込みを促進させる吸込室61と、吸い込まれた流体を底壁25a側の圧縮開始点65aから羽根車3側に向けて斜設した加圧面65で加圧する圧縮室62とからなる加圧室6を形成し、上記加圧面65の圧縮終了点65bと吸込口20との間に、羽根車3の側面に近接し羽根室35内の流体の漏出を防止する加圧仕切り壁63を設けると共に、送出口21を上記圧縮開始点65aと圧縮終了点65bの共に羽根車回転方向下手側の近傍位置とにわたる長さで、羽根31巾と略同巾状に開設することを特徴としている。

【0005】第2に、送出口21の長さ方向の中途部に、流体の送出案内を行うガイド部材9を設けることを特徴としている。

【0006】第3に、圧縮開始点65aを、羽根車回転方向上手側に向けて加圧面65の内周側から外周側に向けて形成することを特徴としている。

【0007】第4に、加圧面65の表面を耐磨耗性部材8によって形成することを特徴としている。

【0008】第5に、羽根31を、羽根車回転方向下手側に向けて緩傾斜の後退角で形成した基部面36から、屈曲面37を介して急傾斜の後退角で形成した案内面38で形成することを特徴としている。

【0009】

【発明の実施の形態】本発明の一実施形態を図面に基づいて説明する。図1～図7において符号1は、本発明の第1実施形態に係わる加圧遠心型のポンプを示す。このポンプ1は、後述する構成によって吸込口20と送出口21を有しドラム状に形成したケース2と、該ケース2内で回転可能に軸支する回転軸(ポンプ軸)30に固定した複数の羽根31を放射状に突出形成する羽根車3とからなり、回転軸30を矢印正転方向に回転させることにより、空気等の気体或いは水、油等の液体(以下これ

らを流体という)を、吸込口20側から直接的に又は点線で示す吸込ホース20aを介してケース2内に吸い込み、これをケース2内で圧縮することにより加圧付勢し、送出口21から直接的に又は送出ホース21aを介し、所望の箇所に良好に送り出すことができるようにしている。

【0010】以下各部の詳細な構成及び作用等について詳述する。先ずこの実施形態におけるケース2は、吸込口20を有する加圧ケース2aと、送出口21を有する羽根車ケース2bとを左右一対として円筒型に分割形成してなり、両者の開口端面をリング状のシール部材2c並びに後述する耐摩耗性部材8を介挿して接合させた状態で、取付ネジ等の固定具2dで複数箇所を締着した接合手段にすることにより、気密構造のポンプ室となる中空状ドラムケースを、簡潔で廉価な構成を以て提供することができるようにしている。尚、接合手段は上記のものに限ることなく、加圧ケース2aと羽根車ケース2bとを、図4で後述する流体送出調節構造7を以て相対的に位置決め回動可能にしながら、気密接合を維持することができる位置決め調節可能型の接合手段にしてもよいものである。

【0011】上記羽根車ケース2bは、円盤状の側壁22の外周に羽根車3を内嵌する巾の周壁23を一体的に形成し、図示例の周壁23はその上部に羽根車3の羽根31と略同巾状の送出口21を、複数の羽根31、31・・・に跨がって後述する所定の長さに穿設すると共に、送出口21には流体の送出方向に湾曲状に収束指向させた送出管21bを一体的に設けている。そして、上記側壁22の中心部には回転軸30を軸支するメタル部5を外側に向けて設けると共に、複数の羽根31を放射方向に同心円で突設した羽根車3を周壁23内で小隙を有して回転軸30に軸支している。

【0012】また上記羽根車3は、図4に示すように回転軸30への取付け部材を兼ねる円柱状のボス部32の側周面に、円盤状の羽根側壁33を一体的に展開形成し、このボス部32及び羽根側壁33から、各放射状の羽根31を所定間隔毎に一体的に突出させて、各羽根31の間に流体を内包させる羽根室35を形成し、回転軸30の外側端を適宜な駆動源から回転駆動することにより羽根車3を回転させるようにしている。尚、図示例の回転軸30は、その他端に設けたプーリ30aにベルト伝動で駆動させるようにしているが、駆動手段はこれに限られるものではない。

【0013】また羽根車3に放射状に設ける羽根31の形状は、羽根車回転方向上手側(以下上手側という)に向けて略直線状面の後退傾斜させていると共に、加圧ケース2a側になる側端を基部側よりも羽根車回転方向下手側(以下下手側という)に先行偏寄せさせるように形成し、これにより、羽根車3の回転に伴い流体を吸込口20から掻込み易くし吸い込みを的確に行わせると共に、

羽根室35内での流体の回転保持を確実にし、且つこれが送出口21部位に至るとき、羽根室35内の流体を後退傾斜させた羽根形状によって遠心力を加えながら、あたかもキックさせるように押し出し付勢をすることができ、流体の放射方向への加圧送出を効率よく行うと共に流圧を的確に高め、また羽根31を簡潔な形状にしてその製作を容易にすることができる等の利点がある。

【0014】また羽根車3は羽根車ケース2bに装着した際に、ボス部32及び羽根31の側端を共に羽根車ケース2bの開口端面と略同高さになるようにしており、上記ボス部32の端面は後述する加圧ケース2aの中心部に柱状に突設させた仕切り壁60の端面と近接状態で接合可能にしている。尚、羽根車3は回転軸30に対しそのボス部32をナットやネジ、キー止め構造で止め固定しているが、両者を一体的に構成してもよいものであると共に、また上記仕切り壁60はボス部32から一連に形成してもよいものである。また羽根31の形状は、図示例のものに限定されることなく、送出口21の位置及び形状等によって適宜な羽根形状に設定可能であり、例えば羽根車3の矢印回転方向の上手側に向けて放物線状の軌跡を以て、湾曲状に後退傾斜させるように形成してもよいものである。

【0015】次に加圧ケース2aについて説明する。図3～図7に示すように加圧ケース2aは、羽根車3を装着した状態の羽根車ケース2bを組付けた状態において、その内壁と羽根車3との間で、吸込口20から流体を大きな抵抗を伴うことなく円滑に吸い込むことができると共に、吸い込んだ流体を効率よく的確に加圧しながら、羽根車3を介し送出口21から良好に送出することができるので、加圧室6を形成するようにしている。即ち、上記加圧室6は、流体の吸い込みを促進させる吸込室61と、これに連通して流体の加圧を行う圧縮室62とからなり、また圧縮室62の終端と吸込口20との間に、羽根室35内の流体漏出防止用の加圧仕切り壁63を、仕切り壁60から所定長にわたって面一な平坦面状となるように一体的に形成し、この仕切り壁60を側壁25の中心部に前記羽根車3のボス部32の端面に対向させて、これと略同径で支柱状に突出させることにより、仕切り壁60周りに吸込室61と圧縮室62及び加圧仕切り壁63を一連に形成している。

【0016】そして上記吸込室61は、加圧ケース2aの側壁25内の底壁25aと周壁26と仕切り壁60及び羽根車3との間で、吸込口20側から略180度程度或いはそれ以下の範囲に形成することにより、流体を吸込口20側からケース2内に吸い込む際に、長い通路の吸込室61に複数の羽根31を臨ませて、その羽根室35内で流体を多量に回転保持し、流体の吸込抵抗を可及的に低減させながら回転方向に加速させることができるようにしている。

【0017】また圧縮室62は、吸込室61の終端に通

じこの底壁25aから、羽根車3の側端に徐々に近接させるように収束する滑らかな斜面に形成した加圧面65を、底壁25a側の圧縮開始点65aから加圧仕切り壁63の始端側の圧縮終了点65bまで、回転方向に略90度程度又はそれ以上の角度範囲に設けて形成しており、これにより吸込室61から回転方向下手側に加速されて移行する流体を、加圧面65に沿わせて徐々に収束し、圧縮室62において大きな圧縮抵抗等を伴うことなく円滑に加圧することができ、加圧面65及び加圧仕切り壁63に対し後述する開口範囲を以て臨設させた送出口21から、加圧流体を効率よく押し出すように送出することができるようにしている。

【0018】そして、この実施形態における加圧面65は図3、図5、図7に示すように圧縮開始点65aを形成することにより、流体の加圧を良好に行うことができるようにしている。即ち、加圧面65の始端部は、圧縮開始点65aを羽根車回転方向上手側に向け内周側Nから外周側Sに向けて順次形成しており（図7）、これにより圧縮開始点65aは加圧面65巾に後退傾斜した軌跡を前記羽根車3の羽根31の後退傾斜面と略同方向となるように描いている。

【0019】従って、相隣合う後退傾斜の羽根31で放射方向に拡開状に形成される羽根室35は、その内部の流体が外周側から圧縮開始点65aを介し加圧面65によって順次内周側に向けて徐々に加圧されるので、流体が加圧面65によって急激に加圧されることによる加圧衝撃負荷を羽根車3にかけることを緩和することができると共に、羽根室35内の流体全体の加圧の促進及びその保持を適切に行った状態で、流体を送出口21に至るとき最高圧力に高め、遠心押出作用と相俟って勢いよく多量に送出することができる等の利点がある。

【0020】また圧縮室62は、上記加圧面65の終端（圧縮終了点65b）から複数の羽根室35に跨がって近接する平坦面状の加圧仕切り壁63を連続的に形成しており、該加圧仕切り壁63で圧縮終了後の複数の羽根室35を塞ぐことにより、該羽根室35内の流体の吸込口20側への漏出を防止しながら、圧縮室62側の圧力を維持させてその送出を良好に行うことができるようにしている。そして加圧仕切り壁63の始端部は、その終端を羽根車3に近接する側に薄肉で延長させることにより形成した延長加圧仕切り壁63aを設け、これにより加圧面65の長さを短くすることなく加圧仕切り壁63の面積を可及的に拡大させて、上記の圧力維持をより確実に行わせると共に、吸い込み効率を向上させることができる吸込口20の形成を簡単に行うことができるようにしている。

【0021】即ち、図示例において延長加圧仕切り壁63aは、側面視で吸込室61の始端に位置する吸込口20の中途部迄を覆う長さに徐々に先鋭に形成していると共に、この延長加圧仕切り壁63aの裏側を滑らかな湾

曲面状の吸込案内面63bを形成し、該吸込案内面63bを介して吸込口20と連通させている。また吸込口20の入口は吸込案内面63bと対向する底壁25a側を、該吸込案内面63bの湾曲面に沿う湾曲面状の吸込案内面63cに形成することにより、両者の湾曲面で形成される吸込口20から吸込室61内に向けて、流体を羽根車3の回転方向下手側に向けて、吸い込み抵抗を低減させた状態で効率よく円滑に吸い込むことができるようにしている。

【0022】また以上のように構成してなる加圧仕切り壁63は、延長加圧仕切り壁63aの延長分だけ吸込室61側にさらに長く形成されるから、羽根車3はさらに複数の羽根室35で大量の圧縮状態の流体を保持することができ、また加圧範囲も長くとることが可能になると共に、送出口21も所望の範囲に可及的に長く大きくすることができるので、簡潔な構成を以て長孔状の送出口21から多量で高圧な流体の送出を良好に行うことができる等の特徴がある。また吸込口20の吸込案内面63bは上記のように側面視で円弧状湾曲面にすると、延長加圧仕切り壁63aの端部は図7に示すような円弧面に形成され、凹入した円弧中心部を吸込室61巾の中心に位置させることができるので、吸込口20から流入する流体の主流を羽根31の長さ方向の中心部に向けさせ、羽根車3による流体の掻込みを良好に行うことができる等の利点がある。

【0023】尚、延長加圧仕切り壁63aは、加圧仕切り壁63に対し着脱及び長さ調節可能に設けるようにしてもよいものであり、この場合には延長加圧仕切り壁63aを所望の形状に簡単に製作することができると共に、その位置決め調節を必要により簡単に行うことができ、ケース本体を共通化しながら多様な用途の加圧遠心ポンプを廉価で簡潔な構成を以て提供できる等の利点がある。また上記のように延長加圧仕切り壁63aを有して長く形成された加圧仕切り壁63は、後述する図4で示す流体送出調節構造7を設ける場合に、その位置決め調節量を広くとることができる等の利点もある。

【0024】次に、羽根車ケース2bの送出口21について説明する。この吸込口20は圧縮室62と加圧仕切り壁63側に対向する羽根車ケース2bの周壁23に、次のように開設することにより多量の流体を高圧で効率よく送出することができるようにしている。即ち、送出口21は周壁23に対し、羽根31の巾と略同巾で前記圧縮開始点65a側からと圧縮終了点65b側とから、それぞれ回転方向下手側近傍で、加圧開始と加圧を所定の距離だけ行う圧縮案内代Lと、加圧をされた流体の加圧保持を所定の距離だけ行う圧縮仕切り代Hを有して、両者の間を加圧された流体を最も効率よく送出することができる範囲として開口位置させるようにしている。従って、送出口21は、羽根車3が高回転し羽根31が高周速になった状態においても、圧縮案内代Lと圧縮仕切

り代Hとの間で加圧された流体の送出範囲を可及的に長く形成した加圧面65に対向し、流体の送出を良好に行うことができるので、高回転型の高性能なポンプ1の提供を容易にする等の利点がある。

【0025】また図2、図6に示すように上記送出口21は、その長さ方向の中途部適所に流体の送出案内を行うガイド部材9を、流体の種類或いは羽根31の枚数並びに形状等によるポンプ特性に対応し、流体抵抗を低減した形状で適数設けることにより、加圧流体を上手側のものから乱流を防止しながら順次的確に誘導送出することができるようにしている。即ち、この実施形態のポンプ1は、エアー等機体の吸い込み送出をするに好適なポンプ形態にしていることから、図示例のガイド部材9は、羽根31巾或いはそれ以上の巾の1枚の肉薄板状片とし、送出口21の長さ方向の中途部上手側に偏寄せさせた位置で羽根31の回転軌跡に近接させて設け、その他端側を流体の送出方向に沿わせた後退傾斜状で所定長に延設した構成にしている。

【0026】従って、このポンプ1の送出口21は、ガイド部材9の上手側と下手側で複数に区画され、上手側の送出口21から羽根室35の外周側の流体を掻き取るように送出案内しながら、下手側の送出口21から羽根室35の内周側の流体を充分な送出距離を有して的確に送出するようにできるので、両流体は送出初期において混合することなく上記ガイド部材9によって区画されながら、送出管21bの形状に沿った送出方向に整流されのち合流送出されることになり、上記両流体が送出初期に同時送出することによる乱流の発生を防止した送出を良好に行うことができるものである。

【0027】次に、図5～図7を参照し前出の加圧面65に設ける耐磨耗性部材8について説明する。図示例において加圧面65の表面を形成する耐磨耗性部材8は、耐磨耗性のゴム又は合成樹脂材で所定の弾力と一定の厚さに形成した可撓性板状体にしており、加圧面65の形状及び加圧仕切り壁63並びに仕切り壁60等の形状に合わせて形成したものを、加圧ケース2aの所定の部位に接着剤或いはネジ止め等の取付け手段によって着脱交換可能に貼着するようにしている。

【0028】これにより、ポンプ1は加圧面65又は加圧仕切り壁63等を、アルミ等金属部材からなる加圧ケース2aと同材質で一体的に形成したものよりも、その損耗を的確に防止し耐久性を格段に向上させることができると共に、該耐磨耗性部材8が長期の使用において損耗した際にも、交換等のメンテナンス作業を簡単に行うことができる。さらに、耐磨耗性部材8はその厚さ或いは形状を適宜に変更することも容易であるから、一つの加圧ケース2aを用いてこれに異なる形状の耐磨耗性部材8を取付固定することにより、各種の用途に適応した仕様のポンプ1を能率よく簡単に製作することができる等の利点がある。

【0029】次に、上記のように構成した本発明のポンプ1を大気中で使用した場合の使用態様並びに作用等について説明する。まず、駆動源を介して羽根車3を回転駆動すると、各羽根31が既述の形状を以て吸込口20からエアーを羽根室35内に確実に掻き込んで吸い込むと共に、吸い込んだエアーを加圧室6の吸込室61内で各羽根室35に収容した状態で持ち回り回転しながら、吸込室61内のエアーを回転方向に加速させて、上記吸込口20の次位のエアー吸い込みを、吸い込み抵抗を低減させた状態で連続的に行い圧縮室62内に至らせる。

【0030】次いで、圧縮室62内に至ったエアーは、上記吸込室61の底壁25a側から羽根車3に徐々に近接する滑らかな斜面の加圧面65に沿って徐々に収束されて圧縮されるとき、加圧面65によって羽根室35内で圧力を高めながら入り込むことになり、次いでこの状態から加圧仕切り壁63に至ると、羽根室35内のエアーは最高圧に維持された状態で送出口21に至り、ここで羽根31の形状及び回転による押し出し力と遠心力を付加されながら、高圧なエアーを多量に一挙に送出することができるものである。

【0031】この場合、本実施形態においては圧縮室62の終端に設けた加圧仕切り壁63を複数の羽根室35に跨がる長さにしていないと共に、該加圧仕切り壁63に薄肉で吸込口20の上方を吸込空間を有して延長させた延長加圧仕切り壁63aを設け、且つ送出口21を吸込口20の回転方向上手側において複数の羽根室35に跨がる長孔状に形成していることにより、羽根車3は複数の羽根室35内に加圧状態のエアーを多量に収容保持しながら、これを長孔状の送出口21から同時に送出することができるので、簡潔な構成を以て風量及び風圧を共に高くしながら円滑に送出することができる。

【0032】また羽根31を、ボス部32と該ボス部32から立設した羽根側壁33とから放射方向に後退傾斜させて一体的に突設すると共に、相隣る羽根31間で形成される羽根室35の側面と周面を開放させ、且つ送出口21を羽根室35に対向する羽根車ケース2bの周壁23に形成したことにより、吸込室61及び圧縮室62内でエアーを各羽根室35内に的確に収容させると共に、吸込室61内のエアーを回転方向に良好に加速させて加圧を促進し、且つ送出口21からのエアー送出を良好に行うことができる等の特徴がある。

【0033】従って、上記のように構成したポンプ1は、羽根車3を小径で小巾にすることが可能になり全体の小型化を図ることができるものでありながら、風量及び風圧を共に高くしてエアーの吸い込み送出を効率よく行うことができるので、騒音の発生も低減することができると共に、利便性を有しその用途分野を拡大することができる等の利点がある。

【0034】一方、上記のように構成した加圧遠心ポンプは、図4で示すようにケース2を、送出口21を備え

た加圧ケース2aと吸込口20を備えた羽根車ケース2bとに分割形成することにより、各ケース2a、2bを個別に加工することができ中空ドラム状のケース2の製作及び組付けを容易に行うことができる。また加圧面65を形成する部材は、加圧ケース2aの底壁25aに対し着脱可能に設けると、両者を個別に簡単に製作することができると共に、加圧面65が摩損した際の交換や補修等のメンテナンス作業を容易に行うことができ、また単一な加圧ケース2aを共用しながら加圧面65部材を変更することにより、各種の用途に適応した所望のポンプ1を能率よく廉価に製作することができる等の利点がある。

【0035】また加圧面65を前述のとおりゴム板等の耐摩耗性部材8を着脱可能に設けて形成するようにしたポンプ1は、砂や金属粉等の異物を含有する種々の流体を送出するとき、加圧面65の損耗を抑制することができると共に、耐摩耗性部材8を交換することにより設定初期状態のポンプ性能の維持を簡単に行うことができる。

【0036】次に、上記のように構成してなるポンプ1の別使用態様並びに応用使用例等について説明する。先ず、このポンプ1は図4に示すように、加圧ケース2aと羽根車ケース2bの対向面をシール部材2c、耐摩耗性部材8等を介して気密に接合すると共に、送出口21を吸込口20の下手側に位置させた状態において、両ケース2a、2bを相対的にスライド回動させて、上記送出口21と吸込口20との間隔を遠近可能に調節するとこの流体送出調節機構7を、簡潔な構成を以て廉価に製作するようにしていると共に、送出口21から送出される流体の圧力及び流量を自由に調節することができるようにしている。

【0037】即ち、同図のポンプ1は流体送出調節機構7を、加圧ケース2a側の周端面に形成した段部70内に羽根車ケース2b側の周端面に突出形成した鏑部71を嵌合した状態で、該鏑部71をリング状の押圧片72で複数の取付ネジ2dを介して押接することにより、加圧ケース2aと羽根車ケース2bとの接合面を周方向に摺動(スライド回動)することができるように構成している。

【0038】これにより、送出口21を吸込口20の回転方向上手側に位置させた状態において、該送出口21と吸込口20との間隔を相対的に調節可能とし、送出口21から送出される流体の圧力を簡単に調節することができる。またこの調節操作は、送出口21を吸込口20と接近状態にさせると、送出口21を流体の圧縮工程側に移動させることができるので、圧縮流体であるエアーの圧力を高め送出口21から強く排出すると共に、逆に送出口21を吸込口20から離間させると、圧縮工程側を少なくしながら上記のものより大量のエアーを送出することができ、またその調節程度を自由に行うことができ

る。

【0039】また上記のように構成した流体送出調節機構7には、同図の点線で示すような調節駆動機構7aを付設してもよく、この場合には、流体送出調節操作を動力を以て随時簡単に行うことができると共に、一定風量或いは一定圧力を所望に維持させる等の目的を有した、自動制御による流体送出自動調節操作を簡単且つ的確に行うことができる等の利点がある。尚、図示例の調節駆動機構7aは、油圧、水圧又は空圧等の流体シリンダ75を、羽根車ケース2bを支持する機体フレーム76側に取付支持した状態で、そのピストンロッド77を加圧ケース2aに取付軸78を介して枢止し、該ピストンロッド77の進退動作で加圧ケース2aを、羽根車ケース2bに対し相対回動させるアクチュエータ構造にしているが、これに限ることなく適宜な駆動モータ等によって加圧ケース2a側を回動させるようにしてもよい。

【0040】一方、上記ポンプ1で水の吸い込み送出を行わせる場合には、図1の点線で示すように、送出管21bに呼び水を行わせることが可能な供給室21cを設置するとよい。即ち、同図の供給室21cは送出管21bの中途部で、適量の水を溜めることができる中空な部屋に形成していると共に、その上側に給水栓を開閉可能に設け、該給水栓から呼び水を所望に供給することによって行う。

【0041】また上記各実施形態において流体送出調節機構7を設ける際には、前記第1実施形態のものと同様な構成してもよいが、これに限ることなく例えば、羽根車ケース2b及び加圧ケース2aを固定した状態において、送出口21或いは吸込口20を周方向に移動調節可能に構成することにより、送出口21を吸込口20に対し羽根車3の回転方向上手側で近接させながら、該送出口21と吸込口20との間隔を相対的に遠近調節して送出流体の流量や圧力を調節するようにしてもよいものである。

【0042】次に、図8～図10を参照し本発明の別実施形態に係わるポンプ1について説明する。尚、上記実施形態のものと同様な構成については説明及び図示を省略する。このポンプ1は、小さな砂等の異物を含む泥水等を吸い込み送出するに好適なサンドポンプとして構成する一実施形態を示しており、このため羽根車3の外周と羽根車ケース2b及び加圧ケース2aの内周との間は、平均的な砂粒径の通過を可能とする3～10ミリ程度の間隙を形成して、羽根車3をケース2内に回転可能に組付けている。

【0043】また羽根車ケース2bの周壁23は送出口21下手側の先端部23aに、既述の耐摩耗性部材8と同様な材質或いはセラミック等の超硬材質からなる耐摩耗性部材8aを、先端部内面で所定の範囲に着脱交換可能に設けており、これにより砂等の異物が激しく接触する先端部23aにおいて、耐摩耗性部材8aがこの部の

摩損を長期にわたって防止すると共に、必要により耐磨耗性部材8aの交換も簡単に行うことができるようにしている。

【0044】また図10に示すように、羽根車3のボス部32は回転軸30を中心とする凹入穴を所定の深さに穿設して外周に鋸部32aを形成すると共に、仕切り壁60から上記鋸部32a内に気密状態で回転可能に嵌合する加圧仕切り部63eを突出形成し、両者を印籠状の嵌合をさせることにより、羽根車3と仕切り壁60間で、流体の漏出移動を簡潔な構成を以て確実に防止することができるようにしている。

【0045】そして図9に示すように、羽根車3はその各羽根31の形状を、ボス部32から立設する平坦面状の基部面36から、上手側に後退傾斜する平坦面状の案内面38を、屈曲面37を介して略く字状に形成し、これにより非圧縮流体としての水の吸い込み及び送出を効率よく円滑に行うことができるようにしている。即ち、各羽根31は屈曲面37を羽根長さの略4分の1程度の基部側寄りに位置させた状態において、羽根車3の中心線に対し、基部面36は略15度程度の後退角で緩傾斜させていると共に、基部面36より長い案内面38は略45度程度の後退角で急傾斜させた形状にしている。

【0046】上記のように形成した羽根31を有する羽根車3は、従来のように放物線状の後退面で滑らかに湾曲形成した各羽根を有する羽根車の場合に、相隣なる羽根間で形成される基部側の羽根室容量が小さくなるものであるのに対し、これを小さくすることなく、基部面36を緩傾斜の後退角にしていることにより、上記基部側の羽根室容量を可及的に拡大させることができると共に、吸込口20及び吸込室61側における水の掻込み初期において、略起立状態の基部面36で水の掻込みを外周への逃げを抑制し確実にを行うと共に羽根室35内に収容した状態で持ち回り、従来のもののように掻込んだ水を羽根室35から一挙に放出させることによる気泡の発生等の不具合を生じさせることなく、回転に伴い屈曲面37を介して案内面38側に移行させることができる。

【0047】また羽根室35内の水は送出口21に至ると羽根31によって送出されるが、このとき略45度程度又はそれ以上に急傾斜の後退角で前記基部面36よりも長く形成している案内面38が、略直線状の平坦面と先端で水を押し上げるように順次強制的に送出するので、羽根室35内の水の送出を確実にすると共に、送出口21内の送出圧力を高めて大量の水を高圧で送出することができる。従って、サンドポンプのように砂土等を含み送出管路内の抵抗が大きいような場合でも、砂土等の異物を含有する泥水類の送出を円滑に行うことができる等の特徴がある。尚、以上のように構成した本発明は、気体や水等のポンプに限ることなく、羽根車回転方式の油圧ポンプとしても効果的に用いることができるも

のである。

【0048】

【発明の効果】本発明は以上のように構成したことにより、次のような効果を奏する。ケース内で羽根車の中心部の側方に仕切り壁を設置し、該仕切り壁の周囲に、吸込口側から流体の吸い込みを促進させる吸込室と、吸い込まれた流体を底壁側の圧縮開始点から羽根車側に向けて斜設した加圧面で加圧する圧縮室とからなる加圧室を形成し、上記加圧面の圧縮終了点と吸込口との間に、羽根車の側面に近接し羽根室内の流体の漏出を防止する加圧仕切り壁を設けると共に、送出口を上記圧縮開始点と圧縮終了点の共に羽根車回転方向下手側の近傍位置にわたる長さで略羽根巾に開設することにより、吸い込んだ流体を仕切り壁周りの各羽根室に収容しながら吸込室内の流体も、回転方向に加速させると共に圧縮室内で徐々に収束させるので、流圧を無理なく高めることができると共に、送出口の略全長を加圧面に臨ませた状態で下手側を加圧仕切り壁に一部対向させるので、送出口において加圧面による押し出し力と羽根による遠心力を付加させながら円滑に送出することができる。従って、流量及び流圧とも高く所望に設定することができる加圧遠心ポンプを、簡潔で廉価な構成を以て製作することができるのと共に、小型化を図ることを可能にする。

【0049】また送出口の長さ方向の中途部に、流体の送出案内を行うガイド部材を設けることにより、ガイド部材で区画された上手側の送出口から羽根室の外周側の流体を掻き取るように送出案内しながら、下手側の送出口から羽根室の内周側の流体を送出距離を有して的確に送出するので、送出初期における流体の乱流を防止した整流状態で送出を良好に行う。

【0050】また圧縮開始点を、羽根車回転方向上手側に向けて加圧面の内周側から外周側に向け形成することにより、相隣なる羽根で拡開状に形成される羽根室の流体を外周側から内周側に向けて徐々に加圧するので、加圧面による急激な加圧を緩和しながら、羽根室内の流体全体の加圧の促進及びその保持を適切に行い、流体を送出口に至るとき最高圧力に高め、羽根車の遠心押出作用と相俟って勢いよく多量に送出することができる。

【0051】また加圧面の表面を耐磨耗性部材で形成することにより、加圧面の損耗を防止しポンプ性能を長期間にわたり維持することができる。

【0052】そして、羽根を、羽根車回転方向下手側に向けて緩傾斜の後退角で形成した基部面から、屈曲面を介して急傾斜の後退角で形成した案内面で形成することにより、基部側の羽根室容量を拡大させることができると共に、流体の掻込み及び持ち回りを良好に行い、また送出口への流体の送出を確実にすることができる。従って、水等液体の吸い込み送出を効率よく行うことができる。

【図面の簡単な説明】

【図1】本発明の第1実施形態に係わる加圧遠心ポンプの正面図。

【図2】図1の左側面図。

【図3】図1の加圧ケースの内側の構成を示す側面図。

【図4】図1の断面構造及び流体送出調節構造を付加した構造を示す断面図。

【図5】図3の加圧ケースの各断面を示し、(A)はA-A線の断面図。(B)はB-B線の断面図。(C)はC-C線の断面図。

【図6】加圧室の構成を展開して示す展開断面図。

【図7】加圧ケース及び羽根車を一部破断して示す斜視図。

【図8】図1のポンプの送出管に供給室を付加する態様を示す側面図。

【図9】本発明の第2実施形態に係わる加圧遠心ポンプの正面図。

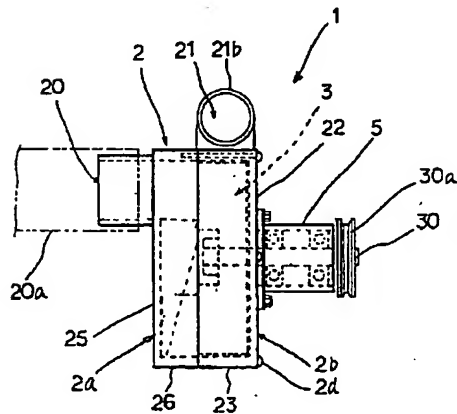
【図10】本発明の第3実施形態に係わる加圧遠心ポンプの正面図。

【符号の説明】

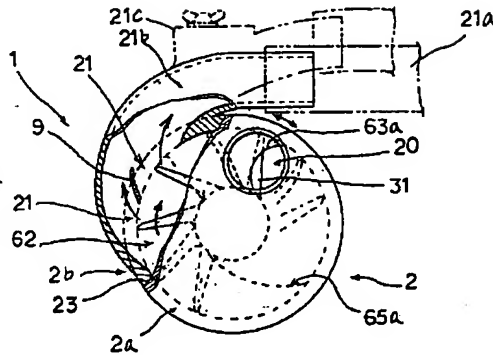
1 ポンプ
1 a 多連型のポンプ

2 ケース
2 a 加圧ケース
2 b 羽根車ケース
3 羽根車
6 加圧室
8 耐磨耗性部材
9 ガイド部材
20 吸込口
21 送出口
30 回転軸
31 羽根
32 ボス部
33 羽根側壁
35 羽根室
36 基部面
37 屈曲面
38 案内面
60 仕切り壁
61 吸込室
62 圧縮室
63 加圧仕切り壁

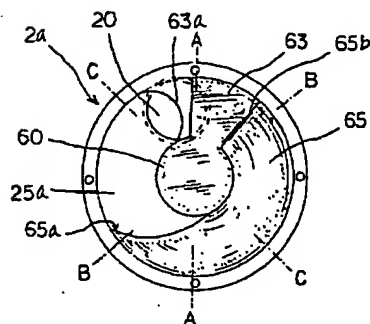
【図1】



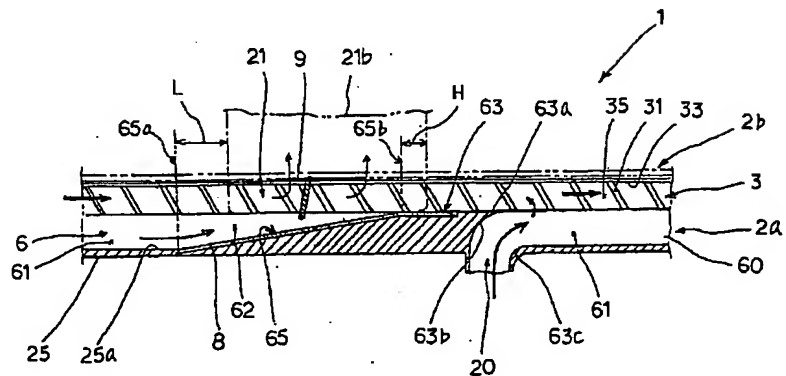
【図2】



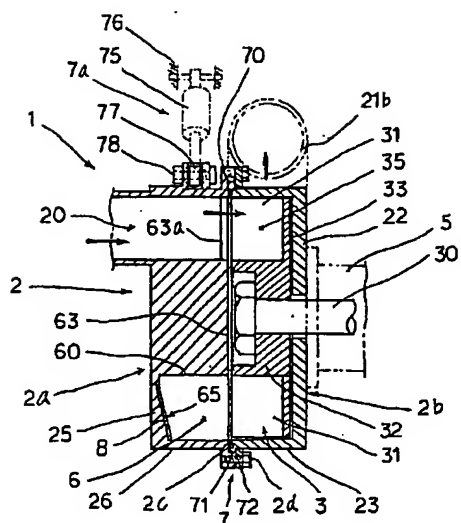
【図3】



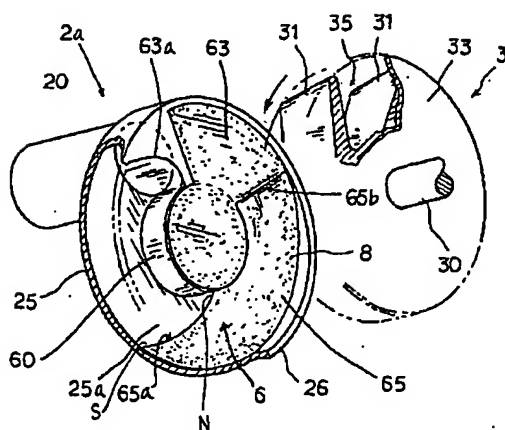
【図6】



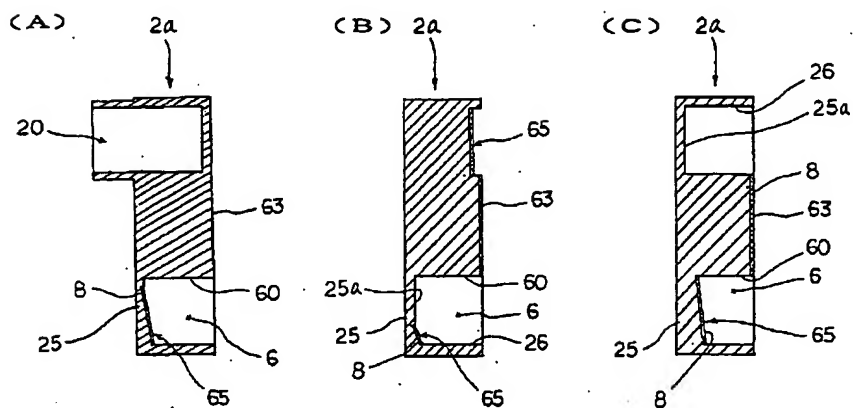
【図4】



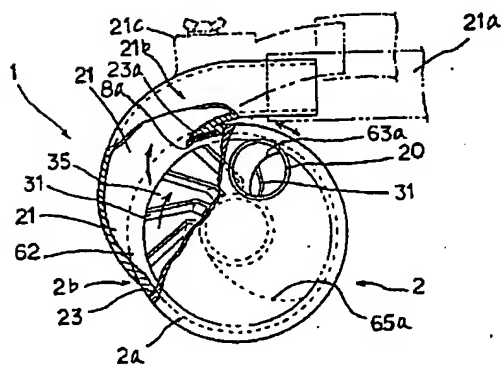
【図7】



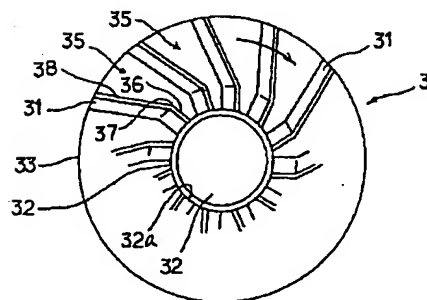
【図5】



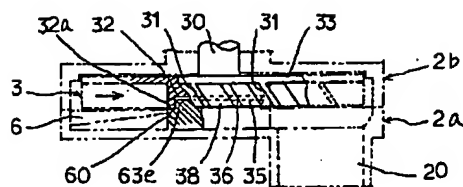
【図8】



【図9】



【図10】



フロントページの続き

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D

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D

Q

E

W

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BB06 CC01 CC03 CC06 CC07

DD01 DD02 DD03 DD06 DD25

DD28 DD29 DD30 EE04 EE05

EE06 EE07 EE09 EE11 EE15

EE16 EE19

3H034 AA01 AA02 AA03 AA11 BB04

BB06 CC01 CC03 CC06 CC07

DD01 DD02 DD05 DD12 DD22

DD24 DD26 DD27 DD28 DD30

EE04 EE05 EE06 EE07 EE09

EE11 EE12 EE14 EE15 EE17

EE18

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CLAIMS

[Claim(s)]

[Claim 1] Within the case (2) of the shape of a drum which has inlet port (20) and sending-out opening (21) By rotating the impeller (3) which formed two or more wings (31) in the radial In the pump which absorbs a fluid from inlet port (20) and is sent out to the exterior from sending-out opening (21) The suction chamber which a bridgewall (60) is installed [suction chamber] in the side of the core of an impeller (3) within said case (2), and makes the perimeter of this bridgewall (60) promote absorption of a fluid from an inlet port (20) side (61), The pressurized room (6) which consists of compression space (62) pressurized in respect of the pressurization (65) which turned and installed the absorbed fluid in the impeller (3) side from the compression start point (65a) by the side of a bottom wall (25a) is formed. While preparing the pressurization bridgewall (63) which approaches the side face of an impeller (3) and prevents exsorption of the fluid in a wing room (35) between the point (65b) of the above-mentioned pressurization side (65) ending [compression], and inlet port (20) The pressurization centrifugal pump characterized by both establishing sending-out opening (21) wing (31) width and in the shape of ***** by the die length covering the near location by the side of the impeller hand-of-cut lower part of the above-mentioned compression start point (65a) and the point (65b) ending [compression].

[Claim 2] The pressurization centrifugal pump of claim 1 which prepares the guide member (9) which performs sending-out guidance of a fluid in the halfway section of the die-length direction of sending-out opening (21).

[Claim 3] Claim 1 or 2 pressurization centrifugal pumps which turn a compression start point (65a) to the improvement hand side in the method of impeller rotation, and form it towards a periphery side from the inner circumference side of a pressurization side (65).

[Claim 4] Claim 1, 2, or 3 pressurization centrifugal pumps which form the front face of a pressurization side (65) by the abrasion resistance member (8).

[Claim 5] Claim 1, 2, 3, or 4 pressurization centrifugal pumps which are formed by the slideway (38) formed by the steep angle of sweepback through the crookedness side (37) from the base side (36) which turned the wing (31) to the impeller hand-of-cut lower part side, and formed it by the angle of sweepback of a gradual slope.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the pressurization centrifugal pump which absorbs and sends out fluids, such as a gas or a liquid, by rotating an impeller within a pump case.

[0002]

[Description of the Prior Art] Conventionally the centrifugal pump which performs suction sending out of fluids, such as Air or water, and an oil By rotating an impeller with two or more wings which form a concave-like wing room within the pump case of the shape of a single drum A fluid is absorbed from inhalation opening prepared in the 1 side said wall surface of this case, and carrying-about rotation of this is carried out, it accelerates, and what was constituted so that a fluid might be sent out from sending-out opening is already known.

[0003]

[Problem(s) to be Solved by the Invention] however, since acceleration rotation is only carried out and the centrifugal pump by the above conventional configurations only sends out a fluid with an impeller within a case, as for the pressure of a sending-out fluid of what can be enlarged with a comparatively easy means (fluid pressure), it is difficult for the amount (flow rate) of a sending-out fluid to make it increase to this flow rate — etc. — there is a fault. Moreover, while becoming easy to produce the turbulent flow of the fluid in the wing interior of a room and reducing pump efficiency, if rotation of an impeller is raised when compensating this, when it is going to raise both fluid pressure and a flow rate, the wing configuration of an impeller becoming complicated and an impeller become path size, the whole pump is enlarged, and there are problems, such as becoming high cost.

[0004]

[Means for Solving the Problem] In order to cancel the above-mentioned conventional trouble, the pressurization centrifugal pump by this invention Within the case 2 of the shape of a drum which has [1st] inlet port 20 and the sending-out opening 21 By rotating the impeller 3 which formed two or more wings 31 in the radial In the pump which absorbs a fluid from inlet port 20 and is sent out to the exterior from the sending-out opening 21 The suction chamber 61 which a bridgewall 60 is installed [suction chamber] in the side of the core of an impeller 3 within said case 2, and makes the perimeter of this bridgewall 60 promote absorption of a fluid from an inlet port 20 side, The pressurized room 6 which consists of compression space 62 pressurized in respect of [65] the pressurization which turned and installed the absorbed fluid in the impeller 3 side from compression start point 65a by the side of bottom wall 25a is formed. Between ending [compression] point 65b of the above-mentioned pressurization side 65, and inlet port 20 While forming the pressurization bridgewall 63 which approaches the side face of an impeller 3 and prevents exsorption of the fluid in the wing room 35 It is characterized by both establishing the sending-out opening 21 wing 31 width and in the shape of ***** by the die length covering the near location by the side of the impeller hand-of-cut lower part of the above-mentioned compression start point 65a and ending [compression] point 65b.

[0005] It is characterized by forming the guide member 9 which performs sending-out guidance

of a fluid in the halfway section of the die-length direction of the sending-out opening 21 the 2nd.

[0006] It is characterized by turning compression start point 65a to the improvement hand side in the method of impeller rotation, and forming it in the 3rd towards a periphery side from the inner circumference side of the pressurization side 65.

[0007] It is characterized by forming the front face of the pressurization side 65 in the 4th by the abrasion resistance member 8.

[0008] It is characterized by forming by the slideway 38 formed by the steep angle of sweepback through the crookedness side 37 from the base side 36 which turned the wing 31 to the impeller hand-of-cut lower part side, and formed [5th] it by the angle of sweepback of a gradual slope.

[0009]

[Embodiment of the Invention] One operation gestalt of this invention is explained based on a drawing. In drawing 1 - drawing 7 , a sign 1 shows the pump of the pressurization centrifugal mold concerning the 1st operation gestalt of this invention. The case 2 which this pump 1 has inlet port 20 and the sending-out opening 21 by the configuration mentioned later, and was formed in the shape of a drum, By consisting of an impeller 3 which projects and forms in a radial two or more wings 31 fixed to the revolving shaft (pumping axes) 30 supported to revolve pivotable within this case 2, and rotating a revolving shaft 30 in the arrow-head normal rotation direction Liquids (these are called fluid below), such as gases, such as air, or water, and an oil It absorbs in a case 2 through suction-hose 20a directly shown by the dotted line from an inlet port 20 side, and pressurization energization is carried out by compressing this within a case 2, and it enables it to send out to a desired part good through sending-out hose 21a directly from the sending-out opening 21.

[0010] A detailed configuration, a detailed operation, etc. of each part are explained in full detail below. Pressurization case 2a in which the case 2 in this operation gestalt has inlet port 20 first, In the condition of having inserted the abrasion resistance member 8 which comes to carry out division formation at the shape of a cylinder bowl type by making into a Uichi Hidari pair impeller case 2b which has the sending-out opening 21, and mentions both opening end face later in a ring-like seal member 2c list, and having made it joining the hollow-like drum case which serves as a pump house of an airtight structure by making it the junction means which put two or more places firmly on by 2d of fasteners, such as an attachment screw, — a brief and cheap configuration — with, it enables it to provide in addition, the fluid sending-out accommodation structure 7 which mentions pressurization case 2a and impeller case 2b later by drawing 4 , without restricting a junction means to the above-mentioned thing — with — relative — positioning — you may make it a junction means of the mold which can be positioning adjusted by which airtight junction is maintainable, making it rotatable.

[0011] The above-mentioned impeller case 2b forms in the periphery of the disc-like side attachment wall 22 in one the peripheral wall 23 of the width which inner-** an impeller 3. the peripheral wall 23 of the example of illustration — the upper part — the wing 31 of an impeller 3, and the *****-like sending-out opening 21 — two or more wings 31 and 31 — while puncturing the predetermined die length later mentioned ranging over ..., delivery-valve 21b which carried out convergence orientation is prepared in the sending-out direction of a fluid in one at the letter of a curve at the sending-out opening 21. And while turning outside the metal section 5 which supports a revolving shaft 30 to revolve and preparing it in the core of the above-mentioned side attachment wall 22, it has areole within a peripheral wall 23, and the impeller 3 which protruded two or more wings 31 in the radiation direction by the concentric circle is supported to revolve to the revolving shaft 30.

[0012] The above-mentioned impeller 3 moreover, around [1 side] the boss section 32 of the shape of a cylinder which serves as the anchoring member to a revolving shaft 30 as shown in drawing 4 Expansion formation of the disc-like wing side attachment wall 33 is carried out in one. From this boss section 32 and the wing side attachment wall 33 The wing 31 of each radial is made to project in one for every predetermined spacing, and he forms the wing room 35 which carries out the endocyst of the fluid between each wing 31, and is trying to rotate an impeller 3 by carrying out the rotation drive of the outside edge of a revolving shaft 30 from a proper

driving source. In addition, although he is trying to make pulley 30a prepared in the other end drive the revolving shaft 30 of the example of illustration by belt transmission, a driving means is not restricted to this.

[0013] Moreover, the configuration of a wing 31 prepared in a radial to an impeller 3 While carrying out a retreat inclination in respect of the shape of an abbreviation straight line towards the improvement hand side in the method of impeller rotation (henceforth a superior side) It forms so that precedence **** of the side edge which is on the pressurization case 2a side may be carried out rather than a base side at an impeller hand-of-cut lower part side (henceforth a lower part side). By this While making it absorb exactly by making a fluid easy to bolt from inlet port 20 with rotation of an impeller 3 When rotation maintenance of the fluid in the wing room 35 is ensured and this reaches sending-out opening 21 part, Applying a centrifugal force with the wing configuration which carried out the retreat inclination of the fluid in the wing room 35 There is an advantage of it being able to energize by extruding so that it may be made to kick, fluid pressure being exactly raised, while performing efficiently pressurization sending out in the radiation direction of a fluid, and a wing 31 being made into a brief configuration, and being able to make the manufacture easy.

[0014] Moreover, when impeller case 2b is equipped with an impeller 3, both the side edges of the boss section 32 and a wing 31 are made to become the opening end face and **** height of impeller case 2b, and the end face of the above-mentioned boss section 32 makes junction possible in the end face and contiguity condition of a bridgewall 60 which were made to protrude on the core of pressurization case 2a mentioned later in the shape of a column. In addition, although the impeller 3 is carrying out stop immobilization of the boss section 32 of opposite *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne. with a nut, a screw, and key stop structure at the revolving shaft 30, while constituting both in one, the above-mentioned bridgewall 60 may be formed in a single string from the boss section 32. moreover — without the configuration of a wing 31 is limited to the thing of the example of illustration — a location, a configuration, etc. of the sending-out opening 21 — a proper wing configuration — a setup — possible — for example, the superior side of the arrow-head hand of cut of an impeller 3 — turning — a parabolic locus — with, you may form so that the letter of a curve may be made to carry out a retreat inclination.

[0015] Next, pressurization case 2a is explained. In the condition of having attached impeller case 2b in the condition that pressurization case 2a equipped with the impeller 3 as shown in drawing 3 - drawing 7 between the wall and impeller 3 He is trying to form the pressurized room 6 which can be sent out good from the sending-out opening 21 through an impeller 3, pressurizing efficiently exactly the fluid which absorbed it while being able to absorb the fluid smoothly, without being accompanied by strong resistance from inlet port 20. The above-mentioned pressurized room 6 consists of a suction chamber 61 which promotes absorption of a fluid, and compression space 62 which is open for free passage to this, and pressurizes a fluid. Namely, moreover, between the termination of compression space 62, and inlet port 20 The pressurization bridgewall 63 for the fluid exsorption prevention in the wing room 35 is formed in one so that it may become the shape of a flat-tapped flat side ranging from the bridgewall 60 to predetermined length. A suction chamber 61, compression space 62, and the pressurization bridgewall 63 are formed in the circumference of a bridgewall 60 at a single string by making the end face of the boss section 32 of said impeller 3 counter the core of a side attachment wall 25, and making this bridgewall 60 project in the shape of a stanchion by this and *****.

[0016] The above-mentioned suction chamber 61 and between bottom wall 25a within the side attachment wall 25 of pressurization case 2a, a peripheral wall 26, a bridgewall 60, and an impeller 3 By forming in about 180 abbreviation or the range not more than it from an inlet port 20 side In case a fluid is absorbed in a case 2 from an inlet port 20 side, two or more wings 31 are made to face the suction chamber 61 of a long path, and rotation maintenance of the fluid is carried out so much in the wing room 35, and it enables it to accelerate a hand of cut, reducing the suction flow resistance of a fluid as much as possible.

[0017] Compression space 62 moreover, the pressurization side 65 formed in the smooth slant face converged so that the side edge of an impeller 3 may be made to approach gradually from

this bottom wall 25a through the termination of a suction chamber 61 From compression start point 65a by the side of bottom wall 25a to ending [compression] point 65b by the side of the start edge of the pressurization bridgewall 63 Prepare in about 90 abbreviation or the include-angle range beyond it, and it forms in a hand of cut. The fluid which shifts by being accelerated at a hand-of-cut lower part side from a suction chamber 61 by this It can pressurize smoothly, without making the pressurization side 65 meet, converging gradually, and being accompanied by strong compression resistance etc. in compression space 62. the opening range later mentioned to the pressurization side 65 and the pressurization bridgewall 63 — with, it enables it to send out from the sending-out opening 21 made to ****, so that a pressurization fluid may be extruded efficiently

[0018] And the pressurization side 65 in this operation gestalt enables it to pressurize a fluid good by forming compression start point 65a, as shown in drawing 3 , drawing 5 , and drawing 7 . That is, the leader of the pressurization side 65 turns compression start point 65a to the improvement hand side in the method of impeller rotation, and is carrying out sequential formation towards the periphery side S from the inner circumference side N (drawing 7), and this is drawing compression start point 65a so that it may become pressurization side 65 width about the locus which carried out the retreat inclination with the retreat inclined plane of the wing 31 of said impeller 3, and an almost same direction.

[0019] Therefore, the wing room 35 formed in the radiation direction in the shape of extension by the wing 31 of an adjacency **** retreat inclination Since the fluid of the interior is gradually pressurized one by one by the pressurization side 65 towards an inner circumference side through compression start point 65a from a periphery side While being able to ease covering the pressurization impact load by a fluid being rapidly pressurized by the pressurization side 65 over an impeller 3 Where promotion and its maintenance of the pressurization of the whole fluid in the wing room 35 are performed appropriately, a fluid is raised to a maximum pressure, when resulting in the sending-out opening 21, and there is an advantage of being able to send out with sufficient vigor so much as a centrifugal extrusion operation and ****.

[0020] Moreover, compression space 62 forms continuously the pressurization bridgewall 63 of the shape of a flat side which approaches ranging over two or more wing rooms 35 from the termination (ending [compression] point 65b) of the above-mentioned pressurization side 65. Preventing the exsorption by the side of the inlet port 20 of the fluid in this wing room 35 by taking up two or more wing rooms 35 after compression termination with this pressurization bridgewall 63, the pressure by the side of compression space 62 is maintained, and it enables it to perform the sending out good. And the leader of the pressurization bridgewall 63 enables it to form simply the inlet port 20 which can raise absorption effectiveness while it makes the area of the pressurization bridgewall 63 expand as much as possible and makes the above-mentioned pressure maintenance ensure, without preparing extended pressurization bridgewall 63a formed by making the termination extend with thin meat to the side close to an impeller 3, and shortening the die length of the pressurization side 65 by this.

[0021] That is, while extended pressurization bridgewall 63a forms gradually in wrap die length even the halfway section of inlet port 20 located in the start edge of a suction chamber 61 by side view acute in the example of illustration, intake slideway 63b of the shape of a smooth curve side is formed, and the background of this extended pressurization bridgewall 63a is made to open for free passage with inlet port 20 through this intake slideway 63b. Moreover, the inlet port of inlet port 20 turns a fluid to the hand-of-cut lower-part side of an impeller 3 towards the inside of a suction chamber 61 from the inlet port 20 formed in respect of both curve, and enables it to absorb it smoothly efficiently by forming the intake slideway 63b and bottom wall 25a side which counters in curve side-like intake slideway 63c along the curve side of this intake slideway 63b, where absorption resistance is reduced.

[0022] Moreover, the pressurization bridgewall 63 which it comes to constitute as mentioned above Since it is formed in a suction-chamber 61 side still longer an extended part of extended pressurization bridgewall 63a, while becoming possible for an impeller 3 to be able to hold the fluid of a lot of compression conditions at further two or more wing rooms 35, and to also take the long pressurization range since sending-out opening 21 can also be enlarged as much as

possible for a long time in the range of desired — a brief configuration — with, there is the description of being able to send out a fluid [that it is abundant and high pressure] good from the long hole-like sending-out opening 21. Moreover, if intake slideway 63b of inlet port 20 is made into a circular curve side by side view as mentioned above Since the edge of extended pressurization bridgewall 63a is formed in a circular face as shown in drawing 7 and the radii core which carried out the reentrant can be located at the core of suction-chamber 61 width The mainstream of the fluid which flows from inlet port 20 is made to be turned to the core of the die-length direction of a wing 31, and there is an advantage of being able to perform ***** of the fluid by the impeller 3 good.

[0023] in addition — while making it prepare extended pressurization bridgewall 63a possible [attachment and detachment and die-length accommodation] to the pressurization bridgewall 63, and being able to manufacture extended pressurization bridgewall 63a easily [a desired configuration] in this case, and that positioning accommodation can be performed easily as occasion demands and a case body is communalized — the pressurization centrifugal pump of various applications — a cheap and brief configuration — with, the advantage of being able to provide is. Moreover, the pressurization bridgewall 63 which has extended pressurization bridgewall 63a as mentioned above, and was formed for a long time also has the advantage of being able to take the large amount of positioning accommodation, when establishing the fluid sending-out accommodation structure 7 shown by drawing 4 mentioned later.

[0024] Next, the sending-out opening 21 of impeller case 2b is explained. This inlet port 20 enables it to send out a lot of fluids to the peripheral wall 23 of impeller case 2b which counters the compression space 62 and pressurization bridgewall 63 side efficiently with high pressure by establishing as follows. The sending-out opening 21 receives a peripheral wall 23. By the width and ***** of a wing 31, respectively from the ending [compression] point 65b side from said compression start point 65a side namely, by the hand-of-cut poor close-attendants side It has the compression partition cost H to which only a predetermined distance performs pressurization maintenance of a fluid carried out to the compression guidance cost L to which only a predetermined distance performs pressurization initiation and pressurization in pressurization, and is made to carry out an opening location as range which can send out most efficiently the fluid pressurized in between both. Therefore, also in the condition that the impeller 3 high-rotated and the wing 31 became high peripheral speed, since the sending-out opening 21 can counter the pressurization side 65 which formed the sending-out range of the fluid pressurized between the compression guidance cost L and the compression partition cost H for a long time as much as possible and can send out a fluid good, it has an advantage, such as offering easy the highly efficient pump 1 of a high rotation mold.

[0025] moreover , the configuration where the above-mentioned sending out opening 21 corresponded the guide member 9 which perform sending out guidance of a fluid in the halfway section proper place of the die length direction to the pump characteristics by a configuration etc. at the class of fluid , or the number of sheets list of a wing 31 as showed in drawing 2 and drawing 6 , and fluid resistance be reduced — adequate several ***** — it enable it to carry out induction sending out of the pressurization fluid exactly one by one by things , prevent a turbulent flow from the thing by the side of superior Since it is made the suitable pump gestalt for the pump 1 of this operation gestalt to carry out suction sending out of airframes, such as Ayr, namely, the guide member 9 of the example of illustration It considers as the closing-in tabular piece of one sheet of wing 31 width or the width beyond it, and the rotation locus of a wing 31 is made to approach in the location made to **** to the halfway section superior side of the die-length direction of the sending-out opening 21, and it prepares, and is made the configuration installed in predetermined length by the letter of a retreat inclination which made the other end side meet in the sending-out direction of a fluid.

[0026] Therefore, carrying out sending-out guidance so that the sending-out opening 21 of this pump 1 may be divided by plurality by the superior [of the guide member 9], and lower part side and the fluid by the side of the periphery of the wing room 35 may be scratched from the sending-out opening 21 by the side of superior Since it has sufficient sending-out distance and the fluid by the side of the inner circumference of the wing room 35 can be exactly sent out

from the sending-out opening 21 by the side of the lower part Both fluids, being divided by the above-mentioned guide member 9 without mixing in the early stages of sending out Sending out which prevented generating of the turbulent flow by being rectified in the sending-out direction in alignment with the configuration of delivery-valve 21b, and back unification sending out being carried out and both the above-mentioned fluids carrying out coincidence sending out in early stages of sending out can be performed good.

[0027] Next, the abrasion resistance member 8 prepared in the above-mentioned pressurization side 65 with reference to drawing 5 - drawing 7 is explained. what be use the abrasion resistance member 8 which form the front face of the pressurization side 65 in the example of illustration as the flexible plate formed in elasticity predetermined by wear-resistant rubber or wear-resistant synthetic resin material, and fixed thickness, and be formed in the configuration of the pressurization side 65, and the pressurization bridgewall 63 list according to the configuration of bridgewall 60 grade -- the predetermined part of pressurization case 2a -- anchoring means, such as adhesives or a screw stop, -- attachment and detachment -- he be try to stick exchangeable

[0028] thereby, a pump 1 can perform a maintenance of exchange etc. easily, also when this abrasion resistance member 8 is worn out in long-term use, while preventing the consumption exactly, being able to boil endurance markedly and being able to raise it rather than what formed the pressurization side 65 or the pressurization bridgewall 63 grade in one with pressurization case 2a and this quality of the material which consist of metal members, such as aluminum. Furthermore, since it is also easy to change the thickness or configuration suitably, the abrasion resistance member 8 has the advantage of being able to manufacture well easily the pump 1 of the specification which was adapted for various kinds of applications by carrying out attachment immobilization of the abrasion resistance member 8 of a configuration which is different for one pressurization case 2a being used.

[0029] Next, an operation etc. is explained to the use mode list at the time of using the pump 1 of this invention constituted as mentioned above in atmospheric air. first -- if the rotation drive of the impeller 3 is carried out through a driving source -- the configuration of previous statement of each wing 31 -- with, while bolting Ayr certainly and absorbing it in the wing room 35 from inlet port 20 Carrying out carrying-about rotation of absorbed Ayr in the condition of having held in each wing room 35 within the suction chamber 61 of a pressurized room 6 A hand of cut is made to accelerate Ayr in a suction chamber 61, Ayr absorption like the degree of the above-mentioned inlet port 20 is continuously performed, where absorption resistance is reduced, and it is made to result in compression space 62.

[0030] Subsequently, when it converges gradually Ayr which resulted in compression space 62 along the pressurization side 65 of the smooth slant face which approaches an impeller 3 gradually from the bottom wall 25a side of the above-mentioned suction chamber 61 and is compressed, According to the pressurization side 65, in the wing room 35, if a pressure will be entered with slight height and it results from this condition subsequently to the pressurization bridgewall 63 Ayr in the wing room 35 can send out high pressure Ayr at once so much, while it results in the sending-out opening 21 after having been maintained by the maximum high pressure, and a configuration, and the extrusion force and centrifugal force by rotation of a wing 31 are added here.

[0031] In this case, while making into the die length over two or more wing rooms 35 the pressurization bridgewall 63 prepared in the termination of compression space 62 in this operation gestalt Extended pressurization bridgewall 63a which it has [a] intake space in this pressurization bridgewall 63, and made it extend the upper part of inlet port 20 with thin meat is prepared. And by forming the sending-out opening 21 in the improvement hand side in the method of rotation of inlet port 20 in the shape of [over two or more wing rooms 35] a long hole since an impeller 3 can send this out to coincidence from the long hole-like sending-out opening 21, carrying out hold maintenance of Ayr of a pressurization condition so much into two or more wing rooms 35 -- a brief configuration -- with, it can send out smoothly, both making airflow and a wind pressure high.

[0032] Moreover, while making a retreat inclination carry out in the radiation direction and

protruding on it in one from the wing side attachment wall 33 set up from the boss section 32 and this boss section 32, a wing 31 adjacency — by having made the side face and peripheral surface of the wing room 35 which are formed between wings 31 open wide, and having formed the sending-out opening 21 in the peripheral wall 23 of impeller case 2b which counters the wing room 35 While making Ayr hold exactly in each wing room 35 within a suction chamber 61 and compression space 62, a hand of cut is made to accelerate Ayr in a suction chamber 61 good, and pressurization is promoted, and there is the description of being able to perform Ayr sending out from the sending-out opening 21 good.

[0033] Therefore, it has an advantage with the expandable application field of owner *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne. in convenience while it can also reduce generating of the noise, since the pump 1 constituted as mentioned above can both make airflow, and a wind pressure high and can perform suction sending out of Ayr efficiently, being able to become possible to make an impeller 3 narrow in a minor diameter, and being able to attain the whole miniaturization.

[0034] By carrying out division formation at pressurization case 2a equipped with the sending-out opening 21 for the case 2 as drawing 4 showed, and impeller case 2b equipped with inlet port 20, the pressurization centrifugal pump constituted as mentioned above on the other hand can process each case 2a and 2b according to an individual, and can perform easily manufacture and attachment of the hollow drum-like case 2. Moreover, if the member which forms the pressurization side 65 is prepared removable to bottom wall 25 of pressurization case 2a, while being able to manufacture both easily according to an individual There is an advantage of being able to manufacture well the pump 1 of the request which was adapted for various kinds of applications at a low price by changing pressurization side 65 member, being able to perform easily the maintenance of the exchange at the time of the pressurization side 65 wearing out, repair, etc., and sharing single pressurization case 2a.

[0035] Moreover, the pump 1 which establishes the pressurization side 65 removable as above-mentioned, and formed the abrasion resistance members 8, such as a rubber plate, can maintain the pump performance of a setting initial state easily by exchanging the abrasion resistance member 8 while being able to control consumption of the pressurization side 65, when the various fluids containing foreign matters, such as sand and a metal powder, are sent out.

[0036] Next, the example of application use etc. is explained to another use mode list of the pump 1 which it comes to constitute as mentioned above. First, as this pump 1 is shown in drawing 4, while joining the opposed face of impeller case 2b to pressurization case 2a airtightly through seal member 2c and abrasion resistance member 8 grade In the condition of having located the sending-out opening 21 in the lower part side of inlet port 20, slide rotation of both case 2a and the 2b is carried out relatively. the fluid sending-out accommodation structure 7 of adjusting spacing of the above-mentioned sending-out opening 21 and inlet port 20 possible [distance] — a brief configuration — with, while trying to manufacture at a low price, it enables it to adjust freely the pressure and flow rate of the fluid sent out from the sending-out opening 21

[0037] Namely, the pump 1 of this drawing is in the condition which fitted in the flange 71 which projected and formed the fluid sending-out accommodation structure 7 in the peripheral edge side by the side of impeller case 2b in the step 70 formed in the peripheral edge side by the side of pressurization case 2a. By contacting this flange 71 by pressing through two or more attachment screw 2d by the ring-like piece 72 of press, it constitutes so that it can slide on the plane of composition of pressurization case 2a and impeller case 2b in a hoop direction (slide rotation).

[0038] Thereby, in the condition of having located the sending-out opening 21 in the improvement hand side in the method of rotation of inlet port 20, accommodation of spacing of this sending-out opening 21 and inlet port 20 is enabled relatively, and the pressure of the fluid sent out from the sending-out opening 21 can be adjusted easily. Moreover, if this accommodation actuation makes the sending-out opening 21 change inlet port 20 into an approach condition, since it can move the sending-out opening 21 to the pressing-operation side of a fluid If the sending-out opening 21 is made to estrange from inlet port 20 conversely while

heightening the pressure of Ayr which is a compression fluid and discharging strongly from the sending-out opening 21, it comes to send out a lot of Ayr than the above-mentioned thing, lessening a pressing-operation side, and the accommodation extent can be performed freely. [0039] moreover, accommodation drive 7a as shown in the fluid sending-out accommodation structure 7 constituted as mentioned above by the dotted line of this drawing -- you may attach -- in this case -- fluid sending-out accommodation actuation -- power -- with, while being able to carry out easily at any time, there is an advantage of being able to perform simply and exactly fluid sending-out automatic regulation actuation by automatic control with the purpose of making a request maintain fixed airflow or a constant pressure etc. In addition, accommodation drive 7a of the example of illustration is in the condition which carried out attachment support of the fluid cylinders 75, such as oil pressure, water pressure, or pneumatics, at the airframe frame 76 side which supports impeller case 2b. Although it is made the actuator structure of ****(ing) the piston rod 77 through the attachment shaft 78 to pressurization case 2a, and carrying out relative rotation of the pressurization case 2a to impeller case 2b in attitude actuation of this piston rod 77 You may make it rotate the pressurization case 2a side with a proper drive motor etc., without restricting to this.

[0040] It is good to, install supply room 21c with possible as the dotted line of drawing 1 shows making a priming perform to delivery-valve 21b on the other hand, in making the above-mentioned pump 1 perform suction sending out of water. Namely, supply room 21c of this drawing is the halfway section of delivery-valve 21b, establishes a hydrant in the bottom possible [closing motion], and performs it by supplying a priming to a request from this hydrant while forming in the hollow room which can collect the water of optimum dose.

[0041] moreover, in case the fluid sending-out accommodation structure 7 is established in each above-mentioned operation gestalt it is the same as that of the thing of said 1st operation gestalt, without restricting to this, although you may constitute In the condition of having fixed impeller case 2b and pressurization case 2a, by constituting the sending-out opening 21 or inlet port 20 possible [migration accommodation] in a hoop direction Making the sending-out opening 21 install nearby by the improvement hand side in the method of rotation of an impeller 3 to inlet port 20, accommodation of the spacing of this sending-out opening 21 and inlet port 20 is carried out relatively, and you may make it adjust the flow rate and pressure of a sending-out fluid.

[0042] Next, with reference to drawing 8 - drawing 10 , the pump 1 concerning another operation gestalt of this invention is explained. In addition, explanation and illustration are omitted about the same configuration as the thing of the above-mentioned operation gestalt. This pump 1 shows 1 operation gestalt constituted as a suitable sand pump to suck in the muddy water containing foreign matters, such as small sand, etc., and send out, for this reason, between the inner circumference of periphery [of an impeller 3], impeller case 2b, and pressurization case 2a, formed the about 3-10mm gap which enables passage of the average diameter of sand granules, and has attached the impeller 3 pivotable in the case 2.

[0043] The peripheral wall 23 of impeller case 2b moreover, to point 23a by the side of the sending-out opening 21 lower part In point 23a in which it has prepared exchangeable and which foreign matters, such as sand, contact violently by this abrasion resistance member 8a which consists of the same quality of the material as the abrasion resistance member 8 as stated above, or the superhard quality of the materials, such as a ceramic, -- the range predetermined by the point inside -- attachment and detachment -- While abrasion resistance member 8a prevents the wear of this section over a long period of time, it enables it to also perform exchange of abrasion resistance member 8a simply as occasion demands.

[0044] Moreover, as shown in drawing 10 , while the boss section 32 of an impeller 3 drills the reentrant hole centering on a revolving shaft 30 in the predetermined depth and forming flange 32a in a periphery projecting and forming pressurization partition section 63e which fits in pivotable in the airtight condition in the above-mentioned flange 32a from a bridgewall 60, and acting pillbox-like fitting as both -- between an impeller 3 and a bridgewall 60 -- exsorption migration of a fluid -- a brief configuration -- with, it enables it to prevent certainly

[0045] And an impeller 3 forms the slideway 38 of the shape of a flat side which carries out a retreat inclination in the shape of ***** through the crookedness side 37, and enables it to

perform the suction of the water of **, and sending out to a superior side smoothly efficiently as incompressible fluid by this from the base side 36 of the shape of a flat side which sets up the configuration of each of that wing 31 from the boss section 32, as shown in drawing 9. That is, each wing 31 makes the slideway 38 longer than the base side 36 the configuration made to incline steeply by the angle of sweepback of about 45 abbreviation while the base side 36 is sloping the crookedness side 37 gradually by the angle of sweepback of about 15 abbreviation to the center line of an impeller 3 in the condition that you made it located in the base side approach about [of wing length] an abbreviation quadrant.

[0046] The impeller 3 which has the wing 31 formed as mentioned above In the case of the impeller which has each wing which carried out curve formation smoothly in respect of a parabolic retreat like before adjacency -- by using the base side 36 as the angle of sweepback of a gradual slope, without the wing room capacity by the side of the base formed between wings making this small to being what becomes small While being able to make the wing room capacity by the side of the above-mentioned base expand as much as possible The water by the side of inlet port 20 and a suction chamber 61 bolts, and it takes round in the condition of having held in the wing room 35 while controlling the recess to a periphery and performing ***** of water certainly in respect of [36] the base of an abbreviation standing-up condition in the first stage. It can be made to shift to a slideway 38 side through the crookedness side 37 with rotation, without producing faults, such as generating of the air bubbles by making the water bolted like the conventional thing emit at once from the wing room 35.

[0047] Moreover, although it will be sent out by the wing 31 if the water in the wing room 35 results in the sending-out opening 21 Since it sends out to a sequential compulsion target so that the slideway 38 currently formed by the steep angle of sweepback for a long time than said base side 36 may push up water more than about 45 abbreviation or it at abbreviation straight-line-like a flat side and a tip at this time While ensuring sending out of the water in the wing room 35, the delivery pressure in the sending-out opening 21 can be heightened, and a lot of water can be sent out with high pressure. Therefore, like a sand pump, including sandy soil etc., even when the resistance in a delivery-valve way is strong, there is the description of being able to send out muddy water containing foreign matters, such as sandy soil, smoothly. In addition, this invention constituted as mentioned above can be effectively used also as a hydraulic pump of an impeller rotary system, without restricting to pumps, such as a gas and water.

[0048]

[Effect of the Invention] By having constituted as mentioned above, this invention does the following effectiveness so. The suction chamber which a bridgewall is installed [suction chamber] in the side of the core of an impeller within a case, and makes the perimeter of this bridgewall promote absorption of a fluid from an inlet port side, The pressurized room which consists of compression space pressurized in respect of the pressurization which turned and installed the absorbed fluid in the impeller side from the compression start point by the side of a bottom wall is formed. Between the point of the above-mentioned pressurization side ending [compression], and inlet port While preparing the pressurization bridgewall which approaches the side face of an impeller and prevents exsorption of the fluid of the wing interior of a room By both establishing sending-out opening to abbreviation wing width by the die length covering the near location by the side of the impeller hand-of-cut lower part of the above-mentioned compression start point and the point ending [compression] Since it is made to converge gradually within compression space, holding the absorbed fluid in each wing room of the circumference of a bridgewall while making a hand of cut also accelerate the fluid in a suction chamber Since a lower part side is made to counter a pressurization bridgewall in part in the condition of having made the pressurization side facing the abbreviation overall length of sending-out opening while being able to raise fluid pressure reasonable, it can send out smoothly, making the extrusion force by the pressurization side, and the centrifugal force by the wing add in sending-out opening. therefore, the pressurization centrifugal pump which can set a flow rate and fluid pressure as a request highly -- a brief and cheap configuration -- with, while being able to manufacture, it makes it possible to attain a miniaturization.

[0049] Moreover, by preparing the guide member which performs sending-out guidance of a fluid

in the halfway section of the die-length direction of sending-out opening Since it has sending-out distance and the fluid by the side of the inner circumference of a wing room is exactly sent out from sending-out opening by the side of the lower part, carrying out sending-out guidance so that the fluid by the side of the periphery of a wing room may be scratched from sending-out opening by the side of superior [who was divided by the guide member], it sends out good in the state of the rectification which prevented the turbulent flow of the fluid in the early stages of sending out.

[0050] moreover, the thing for which a compression start point is turned to the improvement hand side in the method of impeller rotation, and is formed towards a periphery side from the inner circumference side of a pressurization side -- adjacency, since the fluid of the wing room formed in the shape of extension is turned to an inner circumference side and is gradually pressurized from a periphery side by the wing Easing the rapid pressurization by the pressurization side, promotion and its maintenance of the pressurization of the whole fluid of the wing interior of a room can be performed appropriately, a fluid can be raised to a maximum pressure, when resulting in sending-out opening, and it can send out with sufficient vigor so much as a centrifugal extrusion operation of an impeller and ****.

[0051] Moreover, by forming the front face of a pressurization side by the abrasion resistance member, consumption of a pressurization side can be prevented and a pump performance can be maintained over a long period of time.

[0052] And while being able to make the wing room capacity by the side of a base expand by forming by the slideway formed by the steep angle of sweepback through the crookedness side from the base side which turned the wing to the impeller hand-of-cut lower part side, and formed it by the angle of sweepback of a gradual slope, a fluid can bolt, it can take round good, and sending out of the fluid to sending-out opening can be ensured. Therefore, suction sending out of liquids, such as water, can be performed efficiently.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the pressurization centrifugal pump which absorbs and sends out fluids, such as a gas or a liquid, by rotating an impeller within a pump case.

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PRIOR ART

[Description of the Prior Art] The centrifugal pump which performs suction sending out of fluids, such as Air or water, and an oil, conventionally, By rotating an impeller with two or more wings which form a concave-like wing room within the pump case of the shape of a single drum, a fluid is absorbed from inhalation opening prepared in the 1 side said wall surface of this case, and carrying-about rotation of this is carried out, it accelerates, and what was constituted so that a fluid might be sent out from sending-out opening is already known.

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EFFECT OF THE INVENTION

[Effect of the Invention] By having constituted as mentioned above, this invention does the following effectiveness so. The suction chamber which a bridgewall is installed [suction chamber] in the side of the core of an impeller within a case, and makes the perimeter of this bridgewall promote absorption of a fluid from an inlet port side, The pressurized room which consists of compression space pressurized in respect of the pressurization which turned and installed the absorbed fluid in the impeller side from the compression start point by the side of a bottom wall is formed. Between the point of the above-mentioned pressurization side ending [compression], and inlet port While preparing the pressurization bridgewall which approaches the side face of an impeller and prevents exsorption of the fluid of the wing interior of a room By both establishing sending-out opening to abbreviation wing width by the die length covering the near location by the side of the impeller hand-of-cut lower part of the above-mentioned compression start point and the point ending [compression] Since it is made to converge gradually within compression space, holding the absorbed fluid in each wing room of the circumference of a bridgewall while making a hand of cut also accelerate the fluid in a suction chamber Since a lower part side is made to counter a pressurization bridgewall in part in the condition of having made the pressurization side facing the abbreviation overall length of sending-out opening while being able to raise fluid pressure reasonable, it can send out smoothly, making the extrusion force by the pressurization side, and the centrifugal force by the wing add in sending-out opening. therefore, the pressurization centrifugal pump which can set a flow rate and fluid pressure as a request highly — a brief and cheap configuration — with, while being able to manufacture, it makes it possible to attain a miniaturization.

[0049] Moreover, the thing to establish for the guide member which performs sending-out guidance of a fluid in the halfway section of the die-length direction of sending-out opening, Since it has sending-out distance and the fluid by the side of the inner circumference of a wing room is exactly sent out from sending-out opening by the side of the lower part, carrying out sending-out guidance so that the fluid by the side of the periphery of a wing room may be scratched from sending-out opening by the side of superior [who was divided by the guide member], it sends out good in the state of the rectification which prevented the turbulent flow of the fluid in the early stages of sending out.

[0050] moreover, the thing for which a compression start point is turned to the improvement hand side in the method of impeller rotation, and is formed towards a periphery side from the inner circumference side of a pressurization side — adjacency — since the fluid of the wing room formed in the shape of extension is turned to an inner circumference side and is gradually pressurized from a periphery side by the wing Easing the rapid pressurization by the pressurization side, promotion and its maintenance of the pressurization of the whole fluid of the wing interior of a room can be performed appropriately, a fluid can be raised to a maximum pressure, when resulting in sending-out opening, and it can send out with sufficient vigor so much as a centrifugal extrusion operation of an impeller and ****.

[0051] Moreover, by forming the front face of a pressurization side by the abrasion resistance member, consumption of a pressurization side can be prevented and a pump performance can be maintained over a long period of time.

[0052] And while being able to make the wing room capacity by the side of a base expand by forming by the slideway formed by the steep angle of sweepback through the crookedness side from the base side which turned the wing to the impeller hand-of-cut lower part side, and formed it by the angle of sweepback of a gradual slope, a fluid can bolt, it can take round good, and sending out of the fluid to sending-out opening can be ensured. Therefore, suction sending out of liquids, such as water, can be performed efficiently.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] however, since acceleration rotation is only carried out and the centrifugal pump by the above conventional configurations only sends out a fluid with an impeller within a case, as for the pressure of a sending-out fluid of what can be enlarged with a comparatively easy means (fluid pressure), it is difficult for the amount (flow rate) of a sending-out fluid to make it increase to this flow rate — etc. — there is a fault. Moreover, while becoming easy to produce the turbulent flow of the fluid in the wing interior of a room and reducing pump efficiency, if rotation of an impeller is raised when compensating this, when it is going to raise both fluid pressure and a flow rate, the wing configuration of an impeller becoming complicated and an impeller become path size, the whole pump is enlarged, and there are problems, such as becoming high cost.

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MEANS

[Means for Solving the Problem] In order to cancel the above-mentioned conventional trouble, the pressurization centrifugal pump by this invention Within the case 2 of the shape of a drum which has [1st] inlet port 20 and the sending-out opening 21 By rotating the impeller 3 which formed two or more wings 31 in the radial In the pump which absorbs a fluid from inlet port 20 and is sent out to the exterior from the sending-out opening 21 The suction chamber 61 which a bridgewall 60 is installed [suction chamber] in the side of the core of an impeller 3 within said case 2, and makes the perimeter of this bridgewall 60 promote absorption of a fluid from an inlet port 20 side, The pressurized room 6 which consists of compression space 62 pressurized in respect of [65] the pressurization which turned and installed the absorbed fluid in the impeller 3 side from compression start point 65a by the side of bottom wall 25a is formed. Between ending [compression] point 65b of the above-mentioned pressurization side 65, and inlet port 20 While forming the pressurization bridgewall 63 which approaches the side face of an impeller 3 and prevents exsorption of the fluid in the wing room 35 It is characterized by both establishing the sending-out opening 21 wing 31 width and in the shape of ***** by the die length covering the near location by the side of the impeller hand-of-cut lower part of the above-mentioned compression start point 65a and ending [compression] point 65b.

[0005] It is characterized by forming the guide member 9 which performs sending-out guidance of a fluid in the halfway section of the die-length direction of the sending-out opening 21 the 2nd.

[0006] It is characterized by turning compression start point 65a to the improvement hand side in the method of impeller rotation, and forming it in the 3rd towards a periphery side from the inner circumference side of the pressurization side 65.

[0007] It is characterized by forming the front face of the pressurization side 65 in the 4th by the abrasion resistance member 8.

[0008] It is characterized by forming by the slideway 38 formed by the steep angle of sweepback through the crookedness side 37 from the base side 36 which turned the wing 31 to the impeller hand-of-cut lower part side, and formed [5th] it by the angle of sweepback of a gradual slope.

[0009]

[Embodiment of the Invention] One operation gestalt of this invention is explained based on a drawing. In drawing 1 - drawing 7 , a sign 1 shows the pump of the pressurization centrifugal mold concerning the 1st operation gestalt of this invention. The case 2 which this pump 1 has inlet port 20 and the sending-out opening 21 by the configuration mentioned later, and was formed in the shape of a drum, By consisting of an impeller 3 which projects and forms in a radial two or more wings 31 fixed to the revolving shaft (pumping axes) 30 supported to revolve pivotable within this case 2, and rotating a revolving shaft 30 in the arrow-head normal rotation direction Liquids (these are called fluid below), such as gases, such as air, or water, and an oil It absorbs in a case 2 through suction-hose 20a directly shown by the dotted line from an inlet port 20 side, and pressurization energization is carried out by compressing this within a case 2, and it enables it to send out to a desired part good through sending-out hose 21a directly from the sending-out opening 21.

[0010] A detailed configuration, a detailed operation, etc. of each part are explained in full detail

below. Pressurization case 2a in which the case 2 in this operation gestalt has inlet port 20 first, In the condition of having inserted the abrasion resistance member 8 which comes to carry out division formation at the shape of a cylinder bowl type by making into a Uichi Hidari pair impeller case 2b which has the sending-out opening 21, and mentions both opening end face later in a ring-like seal member 2c list, and having made it joining the hollow-like drum case which serves as a pump house of an airtight structure by making it the junction means which put two or more places firmly on by 2d of fasteners, such as an attachment screw, -- a brief and cheap configuration -- with, it enables it to provide in addition, the fluid sending-out accommodation structure 7 which mentions pressurization case 2a and impeller case 2b later by drawing 4, without restricting a junction means to the above-mentioned thing -- with -- relative -- positioning -- you may make it a junction means of the mold which can be positioning adjusted by which airtight junction is maintainable, making it rotatable.

[0011] The above-mentioned impeller case 2b forms in the periphery of the disc-like side attachment wall 22 in one the peripheral wall 23 of the width which inner--** an impeller 3. the peripheral wall 23 of the example of illustration -- the upper part -- the wing 31 of an impeller 3, and the *****-like sending-out opening 21 -- two or more wings 31 and 31 -- while puncturing the predetermined die length later mentioned ranging over ..., delivery-valve 21b which carried out convergence orientation is prepared in the sending-out direction of a fluid in one at the letter of a curve at the sending-out opening 21. And while turning outside the metal section 5 which supports a revolving shaft 30 to revolve and preparing it in the core of the above-mentioned side attachment wall 22, it has areole within a peripheral wall 23, and the impeller 3 which protruded two or more wings 31 in the radiation direction by the concentric circle is supported to revolve to the revolving shaft 30.

[0012] The above-mentioned impeller 3 moreover, around [1 side] the boss section 32 of the shape of a cylinder which serves as the anchoring member to a revolving shaft 30 as shown in drawing 4 Expansion formation of the disc-like wing side attachment wall 33 is carried out in one. From this boss section 32 and the wing side attachment wall 33 The wing 31 of each radial is made to project in one for every predetermined spacing, and he forms the wing room 35 which carries out the endocyst of the fluid between each wing 31, and is trying to rotate an impeller 3 by carrying out the rotation drive of the outside edge of a revolving shaft 30 from a proper driving source. In addition, although he is trying to make pulley 30a prepared in the other end drive the revolving shaft 30 of the example of illustration by belt transmission, a driving means is not restricted to this.

[0013] Moreover, the configuration of a wing 31 prepared in a radial to an impeller 3 While carrying out a retreat inclination in respect of the shape of an abbreviation straight line towards the improvement hand side in the method of impeller rotation (henceforth a superior side) It forms so that precedence **** of the side edge which is on the pressurization case 2a side may be carried out rather than a base side at an impeller hand-of-cut lower part side (henceforth a lower part side). By this While making it absorb exactly by making a fluid easy to bolt from inlet port 20 with rotation of an impeller 3 When rotation maintenance of the fluid in the wing room 35 is ensured and this reaches sending-out opening 21 part, Applying a centrifugal force with the wing configuration which carried out the retreat inclination of the fluid in the wing room 35 There is an advantage of it being able to energize by extruding so that it may be made to kick, fluid pressure being exactly raised, while performing efficiently pressurization sending out in the radiation direction of a fluid, and a wing 31 being made into a brief configuration, and being able to make the manufacture easy.

[0014] Moreover, when impeller case 2b is equipped with an impeller 3, both the side edges of the boss section 32 and a wing 31 are made to become the opening end face and **** height of impeller case 2b, and the end face of the above-mentioned boss section 32 makes junction possible in the end face and contiguity condition of a bridgewall 60 which were made to protrude on the core of pressurization case 2a mentioned later in the shape of a column. In addition, although the impeller 3 is carrying out stop immobilization of the boss section 32 of opposite *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne. with a nut, a screw, and key stop structure at the revolving shaft 30, while constituting both in one, the above-mentioned

bridgewall 60 may be formed in a single string from the boss section 32. moreover — without the configuration of a wing 31 is limited to the thing of the example of illustration — a location, a configuration, etc. of the sending-out opening 21 — a proper wing configuration — a setup — possible — for example, the superior side of the arrow-head hand of cut of an impeller 3 — turning — a parabolic locus — with, you may form so that the letter of a curve may be made to carry out a retreat inclination.

[0015] Next, pressurization case 2a is explained. In the condition of having attached impeller case 2b in the condition that pressurization case 2a equipped with the impeller 3 as shown in drawing 3 — drawing 7 between the wall and impeller 3 He is trying to form the pressurized room 6 which can be sent out good from the sending-out opening 21 through an impeller 3, pressurizing efficiently exactly the fluid which absorbed it while being able to absorb the fluid smoothly, without being accompanied by strong resistance from inlet port 20. The above-mentioned pressurized room 6 consists of a suction chamber 61 which promotes absorption of a fluid, and compression space 62 which is open for free passage to this, and pressurizes a fluid. Namely, moreover, between the termination of compression space 62, and inlet port 20 The pressurization bridgewall 63 for the fluid exsorption prevention in the wing room 35 is formed in one so that it may become the shape of a flat-tapped flat side ranging from the bridgewall 60 to predetermined length. A suction chamber 61, compression space 62, and the pressurization bridgewall 63 are formed in the circumference of a bridgewall 60 at a single string by making the end face of the boss section 32 of said impeller 3 counter the core of a side attachment wall 25, and making this bridgewall 60 project in the shape of a stanchion by this and *****.

[0016] The above-mentioned suction chamber 61 and between bottom wall 25a within the side attachment wall 25 of pressurization case 2a, a peripheral wall 26, a bridgewall 60, and an impeller 3 By forming in about 180 abbreviation or the range not more than it from an inlet port 20 side In case a fluid is absorbed in a case 2 from an inlet port 20 side, two or more wings 31 are made to face the suction chamber 61 of a long path, and rotation maintenance of the fluid is carried out so much in the wing room 35, and it enables it to accelerate a hand of cut, reducing the suction flow resistance of a fluid as much as possible.

[0017] Compression space 62 moreover, the pressurization side 65 formed in the smooth slant face converged so that the side edge of an impeller 3 may be made to approach gradually from this bottom wall 25a through the termination of a suction chamber 61 From compression start point 65a by the side of bottom wall 25a to ending [compression] point 65b by the side of the start edge of the pressurization bridgewall 63 Prepare in about 90 abbreviation or the include-angle range beyond it, and it forms in a hand of cut. The fluid which shifts by being accelerated at a hand-of-cut lower part side from a suction chamber 61 by this It can pressurize smoothly, without making the pressurization side 65 meet, converging gradually, and being accompanied by strong compression resistance etc. in compression space 62. the opening range later mentioned to the pressurization side 65 and the pressurization bridgewall 63 — with, it enables it to send out from the sending-out opening 21 made to ****, so that a pressurization fluid may be extruded efficiently

[0018] And the pressurization side 65 in this operation gestalt enables it to pressurize a fluid good by forming compression start point 65a, as shown in drawing 3 , drawing 5 , and drawing 7 . That is, the leader of the pressurization side 65 turns compression start point 65a to the improvement hand side in the method of impeller rotation, and is carrying out sequential formation towards the periphery side S from the inner circumference side N (drawing 7), and this is drawing compression start point 65a so that it may become pressurization side 65 width about the locus which carried out the retreat inclination with the retreat inclined plane of the wing 31 of said impeller 3, and an almost same direction.

[0019] Therefore, the wing room 35 formed in the radiation direction in the shape of extension by the wing 31 of an adjacency **** retreat inclination Since the fluid of the interior is gradually pressurized one by one by the pressurization side 65 towards an inner circumference side through compression start point 65a from a periphery side While being able to ease covering the pressurization impact load by a fluid being rapidly pressurized by the pressurization side 65 over an impeller 3 Where promotion and its maintenance of the pressurization of the whole fluid in the

wing room 35 are performed appropriately, a fluid is raised to a maximum pressure, when resulting in the sending-out opening 21, and there is an advantage of being able to send out with sufficient vigor so much as a centrifugal extrusion operation and ****.

[0020] Moreover, compression space 62 forms continuously the pressurization bridgewall 63 of the shape of a flat side which approaches ranging over two or more wing rooms 35 from the termination (ending [compression] point 65b) of the above-mentioned pressurization side 65. Preventing the exsorption by the side of the inlet port 20 of the fluid in this wing room 35 by taking up two or more wing rooms 35 after compression termination with this pressurization bridgewall 63, the pressure by the side of compression space 62 is maintained, and it enables it to perform the sending out good. And the leader of the pressurization bridgewall 63 enables it to form simply the inlet port 20 which can raise absorption effectiveness while it makes the area of the pressurization bridgewall 63 expand as much as possible and makes the above-mentioned pressure maintenance ensure, without preparing extended pressurization bridgewall 63a formed by making the termination extend with thin meat to the side close to an impeller 3, and shortening the die length of the pressurization side 65 by this.

[0021] That is, while extended pressurization bridgewall 63a forms gradually in wrap die length even the halfway section of inlet port 20 located in the start edge of a suction chamber 61 by side view acute in the example of illustration, intake slideway 63b of the shape of a smooth curve side is formed, and the background of this extended pressurization bridgewall 63a is made to open for free passage with inlet port 20 through this intake slideway 63b. Moreover, the inlet port of inlet port 20 turns a fluid to the hand-of-cut lower-part side of an impeller 3 towards the inside of a suction chamber 61 from the inlet port 20 formed in respect of both curve, and enables it to absorb it smoothly efficiently by forming the intake slideway 63b and bottom wall 25a side which counters in curve side-like intake slideway 63c along the curve side of this intake slideway 63b, where absorption resistance is reduced.

[0022] Moreover, the pressurization bridgewall 63 which it comes to constitute as mentioned above Since it is formed in a suction-chamber 61 side still longer an extended part of extended pressurization bridgewall 63a, while becoming possible for an impeller 3 to be able to hold the fluid of a lot of compression conditions at further two or more wing rooms 35, and to also take the long pressurization range since sending-out opening 21 can also be enlarged as much as possible for a long time in the range of desired — a brief configuration — with, there is the description of being able to send out a fluid [that it is abundant and high pressure] good from the long hole-like sending-out opening 21. Moreover, if intake slideway 63b of inlet port 20 is made into a circular curve side by side view as mentioned above Since the edge of extended pressurization bridgewall 63a is formed in a circular face as shown in drawing 7 and the radii core which carried out the reentrant can be located at the core of suction-chamber 61 width The mainstream of the fluid which flows from inlet port 20 is made to be turned to the core of the die-length direction of a wing 31, and there is an advantage of being able to perform ***** of the fluid by the impeller 3 good.

[0023] in addition — while making it prepare extended pressurization bridgewall 63a possible [attachment and detachment and die-length accommodation] to the pressurization bridgewall 63, and being able to manufacture extended pressurization bridgewall 63a easily [a desired configuration] in this case, and that positioning accommodation can be performed easily as occasion demands and a case body is communalized — the pressurization centrifugal pump of various applications — a cheap and brief configuration — with, the advantage of being able to provide is. Moreover, the pressurization bridgewall 63 which has extended pressurization bridgewall 63a as mentioned above, and was formed for a long time also has the advantage of being able to take the large amount of positioning accommodation, when establishing the fluid sending-out accommodation structure 7 shown by drawing 4 mentioned later.

[0024] Next, the sending-out opening 21 of impeller case 2b is explained. This inlet port 20 enables it to send out a lot of fluids to the peripheral wall 23 of impeller case 2b which counters the compression space 62 and pressurization bridgewall 63 side efficiently with high pressure by establishing as follows. The sending-out opening 21 receives a peripheral wall 23. By the width and ***** of a wing 31, respectively from the ending [compression] point 65b side from said

compression start point 65a side namely, by the hand-of-cut poor close-attendants side It has the compression partition cost H to which only a predetermined distance performs pressurization maintenance of a fluid carried out to the compression guidance cost L to which only a predetermined distance performs pressurization initiation and pressurization in pressurization, and is made to carry out an opening location as range which can send out most efficiently the fluid pressurized in between both. Therefore, also in the condition that the impeller 3 high-rotated and the wing 31 became high peripheral speed, since the sending-out opening 21 can counter the pressurization side 65 which formed the sending-out range of the fluid pressurized between the compression guidance cost L and the compression partition cost H for a long time as much as possible and can send out a fluid good, it has an advantage, such as offering easy the highly efficient pump 1 of a high rotation mold.

[0025] moreover, the configuration where the above-mentioned sending out opening 21 corresponded the guide member 9 which perform sending out guidance of a fluid in the halfway section proper place of the die length direction to the pump characteristics by a configuration etc. at the class of fluid, or the number of sheets list of a wing 31 as showed in drawing 2 and drawing 6, and fluid resistance be reduced -- adequate several ***** -- it enable it to carry out induction sending out of the pressurization fluid exactly one by one by things, prevent a turbulent flow from the thing by the side of superior Since it is made the suitable pump gestalt for the pump 1 of this operation gestalt to carry out suction sending out of airframes, such as Ayr, namely, the guide member 9 of the example of illustration It considers as the closing-in tabular piece of one sheet of wing 31 width or the width beyond it, and the rotation locus of a wing 31 is made to approach in the location made to **** to the halfway section superior side of the die-length direction of the sending-out opening 21, and it prepares, and is made the configuration installed in predetermined length by the letter of a retreat inclination which made the other end side meet in the sending-out direction of a fluid.

[0026] Therefore, carrying out sending-out guidance so that the sending-out opening 21 of this pump 1 may be divided by plurality by the superior [of the guide member 9], and lower part side and the fluid by the side of the periphery of the wing room 35 may be scratched from the sending-out opening 21 by the side of superior Since it has sufficient sending-out distance and the fluid by the side of the inner circumference of the wing room 35 can be exactly sent out from the sending-out opening 21 by the side of the lower part Both fluids, being divided by the above-mentioned guide member 9 without mixing in the early stages of sending out Sending out which prevented generating of the turbulent flow by being rectified in the sending-out direction in alignment with the configuration of delivery-valve 21b, and back unification sending out being carried out and both the above-mentioned fluids carrying out coincidence sending out in early stages of sending out can be performed good.

[0027] Next, the abrasion resistance member 8 prepared in the above-mentioned pressurization side 65 with reference to drawing 5 - drawing 7 is explained. what be use the abrasion resistance member 8 which form the front face of the pressurization side 65 in the example of illustration as the flexible plate formed in elasticity predetermined by wear-resistant rubber or wear-resistant synthetic resin material, and fixed thickness, and be formed in the configuration of the pressurization side 65, and the pressurization bridgewall 63 list according to the configuration of bridgewall 60 grade -- the predetermined part of pressurization case 2a -- anchoring means, such as adhesives or a screw stop, -- attachment and detachment -- he be try to stick exchangeable

[0028] thereby, a pump 1 can perform a maintenance of exchange etc. easily, also when this abrasion resistance member 8 is worn out in long-term use, while preventing the consumption exactly, being able to boil endurance markedly and being able to raise it rather than what formed the pressurization side 65 or the pressurization bridgewall 63 grade in one with pressurization case 2a and this quality of the material which consist of metal members, such as aluminum. Furthermore, since it is also easy to change the thickness or configuration suitably, the abrasion resistance member 8 has the advantage of being able to manufacture well easily the pump 1 of the specification which was adapted for various kinds of applications by carrying out attachment immobilization of the abrasion resistance member 8 of a configuration which is different for one

pressurization case 2a being used.

[0029] Next, an operation etc. is explained to the use mode list at the time of using the pump 1 of this invention constituted as mentioned above in atmospheric air. first — if the rotation drive of the impeller 3 is carried out through a driving source — the configuration of previous statement of each wing 31 — with, while bolting Ayr certainly and absorbing it in the wing room 35 from inlet port 20 Carrying out carrying-about rotation of absorbed Ayr in the condition of having held in each wing room 35 within the suction chamber 61 of a pressurized room 6 A hand of cut is made to accelerate Ayr in a suction chamber 61, Ayr absorption like the degree of the above-mentioned inlet port 20 is continuously performed, where absorption resistance is reduced, and it is made to result in compression space 62.

[0030] Subsequently, when it converges gradually Ayr which resulted in compression space 62 along the pressurization side 65 of the smooth slant face which approaches an impeller 3 gradually from the bottom wall 25a side of the above-mentioned suction chamber 61 and is compressed, According to the pressurization side 65, in the wing room 35, if a pressure will be entered with slight height and it results from this condition subsequently to the pressurization bridgewall 63 Ayr in the wing room 35 can send out high pressure Ayr at once so much, while it results in the sending-out opening 21 after having been maintained by the maximum high pressure, and a configuration, and the extrusion force and centrifugal force by rotation of a wing 31 are added here.

[0031] In this case, while making into the die length over two or more wing rooms 35 the pressurization bridgewall 63 prepared in the termination of compression space 62 in this operation gestalt Extended pressurization bridgewall 63a which it has [a] intake space in this pressurization bridgewall 63, and made it extend the upper part of inlet port 20 with thin meat is prepared. And by forming the sending-out opening 21 in the improvement hand side in the method of rotation of inlet port 20 in the shape of [over two or more wing rooms 35] a long hole since an impeller 3 can send this out to coincidence from the long hole-like sending-out opening 21, carrying out hold maintenance of Ayr of a pressurization condition so much into two or more wing rooms 35 — a brief configuration — with, it can send out smoothly, both making airflow and a wind pressure high.

[0032] Moreover, while making a retreat inclination carry out in the radiation direction and protruding on it in one from the wing side attachment wall 33 set up from the boss section 32 and this boss section 32, a wing 31 adjacency — by having made the side face and peripheral surface of the wing room 35 which are formed between wings 31 open wide, and having formed the sending-out opening 21 in the peripheral wall 23 of impeller case 2b which counters the wing room 35 While making Ayr hold exactly in each wing room 35 within a suction chamber 61 and compression space 62, a hand of cut is made to accelerate Ayr in a suction chamber 61 good, and pressurization is promoted, and there is the description of being able to perform Ayr sending out from the sending-out opening 21 good.

[0033] Therefore, it has an advantage with the expandable application field of owner *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne. in convenience while it can also reduce generating of the noise, since the pump 1 constituted as mentioned above can both make airflow and a wind pressure high and can perform suction sending out of Ayr efficiently, being able to become possible to make an impeller 3 narrow in a minor diameter, and being able to attain the whole miniaturization.

[0034] By carrying out division formation at pressurization case 2a equipped with the sending-out opening 21 for the case 2 as drawing 4 showed, and impeller case 2b equipped with inlet port 20, the pressurization centrifugal pump constituted as mentioned above on the other hand can process each case 2a and 2b according to an individual, and can perform easily manufacture and attachment of the hollow drum-like case 2. Moreover, if the member which forms the pressurization side 65 is prepared removable to bottom wall 25 of pressurization case 2a a, while being able to manufacture both easily according to an individual There is an advantage of being able to manufacture well the pump 1 of the request which was adapted for various kinds of applications at a low price by changing pressurization side 65 member, being able to perform easily the maintenance of the exchange at the time of the pressurization side 65 wearing out,

repair, etc., and sharing single pressurization case 2a.

[0035] Moreover, the pump 1 which establishes the pressurization side 65 removable as above-mentioned, and formed the abrasion resistance members 8, such as a rubber plate, can maintain the pump performance of a setting initial state easily by exchanging the abrasion resistance member 8 while being able to control consumption of the pressurization side 65, when the various fluids containing foreign matters, such as sand and a metal powder, are sent out.

[0036] Next, the example of application use etc. is explained to another use mode list of the pump 1 which it comes to constitute as mentioned above. First, as this pump 1 is shown in drawing 4, while joining the opposed face of impeller case 2b to pressurization case 2a airtightly through seal member 2c and abrasion resistance member 8 grade In the condition of having located the sending-out opening 21 in the lower part side of inlet port 20, slide rotation of both case 2a and the 2b is carried out relatively. the fluid sending-out accommodation structure 7 of adjusting spacing of the above-mentioned sending-out opening 21 and inlet port 20 possible [distance] — a brief configuration — with, while trying to manufacture at a low price, it enables it to adjust freely the pressure and flow rate of the fluid sent out from the sending-out opening 21

[0037] Namely, the pump 1 of this drawing is in the condition which fitted in the flange 71 which projected and formed the fluid sending-out accommodation structure 7 in the peripheral edge side by the side of impeller case 2b in the step 70 formed in the peripheral edge side by the side of pressurization case 2a. By contacting this flange 71 by pressing through two or more attachment screw 2d by the ring-like piece 72 of press, it constitutes so that it can slide on the plane of composition of pressurization case 2a and impeller case 2b in a hoop direction (slide rotation).

[0038] Thereby, in the condition of having located the sending-out opening 21 in the improvement hand side in the method of rotation of inlet port 20, accommodation of spacing of this sending-out opening 21 and inlet port 20 is enabled relatively, and the pressure of the fluid sent out from the sending-out opening 21 can be adjusted easily. Moreover, if this accommodation actuation makes the sending-out opening 21 change inlet port 20 into an approach condition, since it can move the sending-out opening 21 to the pressing-operation side of a fluid If the sending-out opening 21 is made to estrange from inlet port 20 conversely while heightening the pressure of Ayr which is a compression fluid and discharging strongly from the sending-out opening 21, it comes to send out a lot of Ayr than the above-mentioned thing, lessening a pressing-operation side, and the accommodation extent can be performed freely.

[0039] moreover, accommodation drive 7a as shown in the fluid sending-out accommodation structure 7 constituted as mentioned above by the dotted line of this drawing — you may attach — in this case — fluid sending-out accommodation actuation — power — with, while being able to carry out easily at any time, there is an advantage of being able to perform simply and exactly fluid sending-out automatic regulation actuation by automatic control with the purpose of making a request maintain fixed airflow or a constant pressure etc. In addition, accommodation drive 7a of the example of illustration is in the condition which carried out attachment support of the fluid cylinders 75, such as oil pressure, water pressure, or pneumatics, at the airframe frame 76 side which supports impeller case 2b. Although it is made the actuator structure of ****(ing) the piston rod 77 through the attachment shaft 78 to pressurization case 2a, and carrying out relative rotation of the pressurization case 2a to impeller case 2b in attitude actuation of this piston rod 77 You may make it rotate the pressurization case 2a side with a proper drive motor etc., without restricting to this.

[0040] It is good to, install supply room 21c with possible as the dotted line of drawing 1 shows making a priming perform to delivery-valve 21b on the other hand, in making the above-mentioned pump 1 perform suction sending out of water. Namely, supply room 21c of this drawing is the halfway section of delivery-valve 21b, establishes a hydrant in the bottom possible [closing motion], and performs it by supplying a priming to a request from this hydrant while forming in the hollow room which can collect the water of optimum dose.

[0041] moreover, in case the fluid sending-out accommodation structure 7 is established in each above-mentioned operation gestalt it is the same as that of the thing of said 1st operation

gestalt, without restricting to this, although you may constitute In the condition of having fixed impeller case 2b and pressurization case 2a, by constituting the sending-out opening 21 or inlet port 20 possible [migration accommodation] in a hoop direction Making the sending-out opening 21 install nearby by the improvement hand side in the method of rotation of an impeller 3 to inlet port 20, accommodation of the spacing of this sending-out opening 21 and inlet port 20 is carried out relatively, and you may make it adjust the flow rate and pressure of a sending-out fluid.

[0042] Next, with reference to drawing 8 - drawing 10 , the pump 1 concerning another operation gestalt of this invention is explained. In addition, explanation and illustration are omitted about the same configuration as the thing of the above-mentioned operation gestalt. This pump 1 shows 1 operation gestalt constituted as a suitable sand pump to suck in the muddy water containing foreign matters, such as small sand, etc., and send out, for this reason, between the inner circumference of periphery [of an impeller 3], impeller case 2b, and pressurization case 2a, formed the about 3-10mm gap which enables passage of the average diameter of sand granules, and has attached the impeller 3 pivotable in the case 2.

[0043] The peripheral wall 23 of impeller case 2b moreover, to point 23a by the side of the sending-out opening 21 lower part In point 23a in which it has prepared exchangeable and which foreign matters, such as sand, contact violently by this abrasion resistance member 8a which consists of the same quality of the material as the abrasion resistance member 8 as stated above, or the superhard quality of the materials, such as a ceramic, — the range predetermined by the point inside — attachment and detachment — While abrasion resistance member 8a prevents the wear of this section over a long period of time, it enables it to also perform exchange of abrasion resistance member 8a simply as occasion demands.

[0044] Moreover, as shown in drawing 10 , while the boss section 32 of an impeller 3 drills the reentrant hole centering on a revolving shaft 30 in the predetermined depth and forming flange 32a in a periphery projecting and forming pressurization partition section 63e which fits in pivotable in the airtight condition in the above-mentioned flange 32a from a bridgewall 60, and acting pillbox-like fitting as both — between an impeller 3 and a bridgewall 60 — exsorption migration of a fluid — a brief configuration — with, it enables it to prevent certainly

[0045] And an impeller 3 forms the slideway 38 of the shape of a flat side which carries out a retreat inclination in the shape of ***** through the crookedness side 37, and enables it to perform the suction of the water of **, and sending out to a superior side smoothly efficiently as incompressible fluid by this from the base side 36 of the shape of a flat side which sets up the configuration of each of that wing 31 from the boss section 32, as shown in drawing 9 . That is, each wing 31 makes the slideway 38 longer than the base side 36 the configuration made to incline steeply by the angle of sweepback of about 45 abbreviation while the base side 36 is sloping the crookedness side 37 gradually by the angle of sweepback of about 15 abbreviation to the center line of an impeller 3 in the condition that you made it located in the base side approach about [of wing length] an abbreviation quadrant.

[0046] The impeller 3 which has the wing 31 formed as mentioned above In the case of the impeller which has each wing which carried out curve formation smoothly in respect of a parabolic retreat like before adjacency — by using the base side 36 as the angle of sweepback of a gradual slope, without the wing room capacity by the side of the base formed between wings making this small to being what becomes small While being able to make the wing room capacity by the side of the above-mentioned base expand as much as possible The water by the side of inlet port 20 and a suction chamber 61 bolts, and it takes round in the condition of having held in the wing room 35 while controlling the recess to a periphery and performing ***** of water certainly in respect of [36] the base of an abbreviation standing-up condition in the first stage. It can be made to shift to a slideway 38 side through the crookedness side 37 with rotation, without producing faults, such as generating of the air bubbles by making the water bolted like the conventional thing emit at once from the wing room 35.

[0047] Moreover, although it will be sent out by the wing 31 if the water in the wing room 35 results in the sending-out opening 21 Since it sends out to a sequential compulsion target so that the slideway 38 currently formed by the steep angle of sweepback for a long time than said base side 36 may push up water more than about 45 abbreviation or it at abbreviation straight-

line-like a flat side and a tip at this time While ensuring sending out of the water in the wing room 35, the delivery pressure in the sending-out opening 21 can be heightened, and a lot of water can be sent out with high pressure. Therefore, like a sand pump, including sandy soil etc., even when the resistance in a delivery-valve way is strong, there is the description of being able to send out muddy water containing foreign matters, such as sandy soil, smoothly. In addition, this invention constituted as mentioned above can be effectively used also as a hydraulic pump of an impeller rotary system, without restricting to pumps, such as a gas and water.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The front view of the pressurization centrifugal pump concerning the 1st operation gestalt of this invention.

[Drawing 2] The left side view of drawing 1 .

[Drawing 3] The side elevation showing the configuration inside the pressurization case of drawing 1 .

[Drawing 4] The sectional view showing the structure which added the cross-section structure of drawing 1 , and fluid sending-out accommodation structure.

[Drawing 5] Each cross section of the pressurization case of drawing 3 is shown, and (A) is the sectional view of an A-A line. (B) is the sectional view of a B-B line. (C) is the sectional view of a C-C line.

[Drawing 6] The expansion sectional view developing and showing the configuration of a pressurized room.

[Drawing 7] The perspective view in which fracturing and showing a part of pressurization case and impeller.

[Drawing 8] The side elevation showing the mode which adds a supply room to the delivery valve of the pump of drawing 1 .

[Drawing 9] The front view of the pressurization centrifugal pump concerning the 2nd operation gestalt of this invention.

[Drawing 10] The front view of the pressurization centrifugal pump concerning the 3rd operation gestalt of this invention.

[Description of Notations]

1 Pump

1a The pump of a multiple-string mold

2 Case

2a Pressurization case

2b Impeller case

3 Impeller

6 Pressurized Room

8 Abrasion Resistance Member

9 Guide Member

20 Inlet Port

21 Sending-Out Opening

30 Revolving Shaft

31 Wing

32 Boss Section

33 Wing Side Attachment Wall

35 Wing Room

36 Base Side

37 Crookedness Side

38 Slideway

60 Bridgewall
61 Suction Chamber
62 Compression Space
63 Pressurization Bridgewall

[Translation done.]